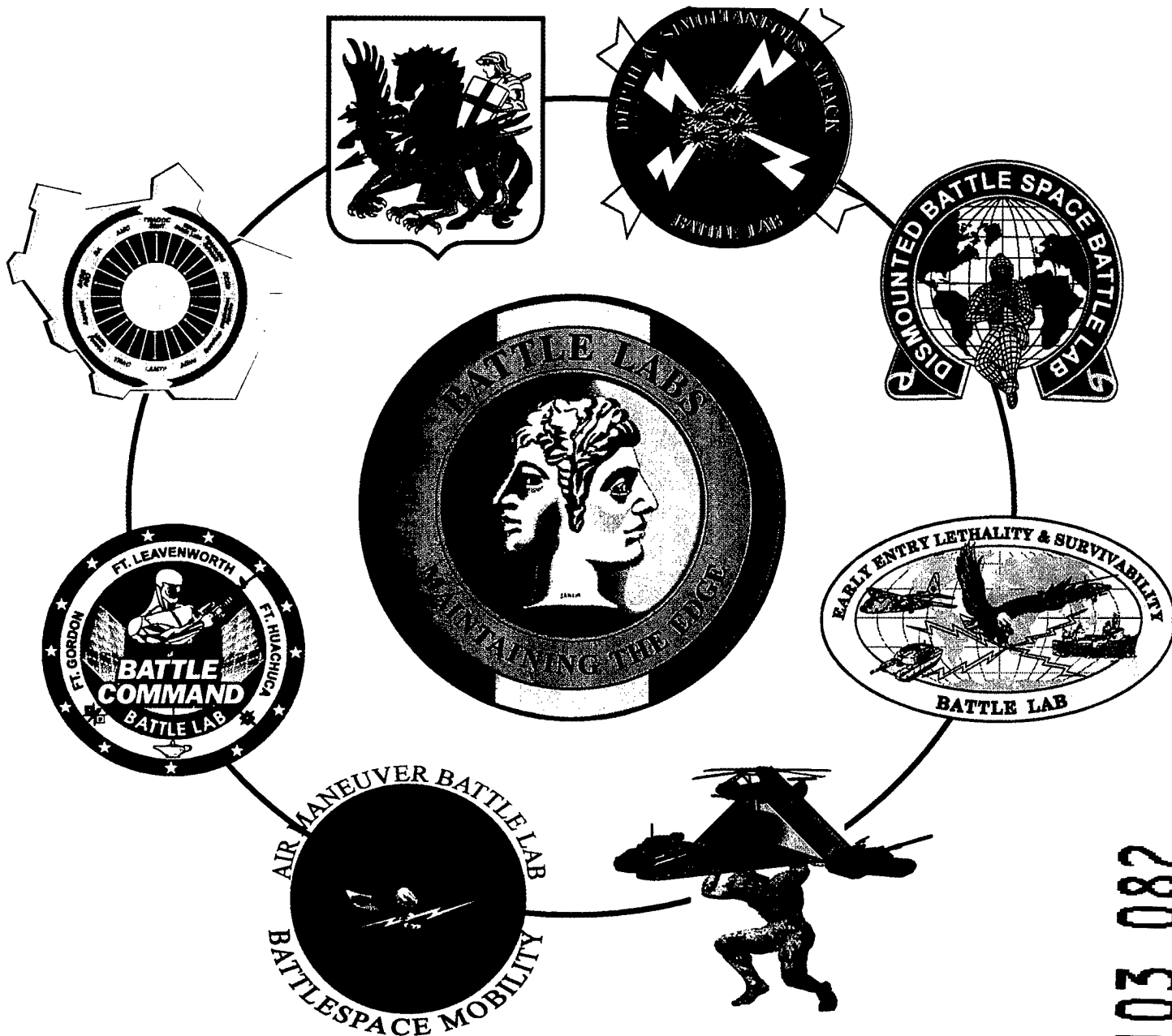


UNITED STATES ARMY  
TRAINING AND DOCTRINE COMMAND  
AND  
UNITED STATES ARMY MATERIAL COMMAND



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ADVANCED CONCEPTS & TECHNOLOGY II  
PRE-PROPOSAL CONFERENCE  
APRIL 14 -15, 1997

20000103 082



## DEPARTMENT OF THE ARMY

HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND  
FORT MONROE, VIRGINIA 23651-5000

March 4, 1997

REPLY TO  
ATTENTION OF

Battle Lab Integration, Technology  
and Concepts Directorate

Ladies and Gentlemen:

I am pleased to present to you the proceedings of the Advanced Concepts and Technology II (ACT II) Pre-Proposal Conference for Fiscal Year 1998. The purpose of this conference is threefold. First, to present "technology demonstration interests" of the Battle Labs to industry and facilitate discussion topics; second, to allow industry to comment on the Draft Broad Agency Announcement (BAA); and third, to provide industry an opportunity to question the ACT II Program and procedures. These objectives are aimed at helping industry understand and respond to Army war-fighting capability requirements and for improving the ACT II Program.

This program represents the single best means for industry to demonstrate mature or nearing maturity technologies to the Battle Labs. Nowhere else in the Army's modernization efforts can industry's independent research and development efforts, combined with the streamlined acquisition approach, provide immediate technology superiority for the Army of the 21st century.

Your participation is warmly accepted, and we actively seek a partnership with you.

Sincerely,

A handwritten signature in cursive script, reading "Robert T. Clark".

Robert T. Clark  
Brigadier General, U.S. Army  
Deputy Chief of Staff for  
Combat Developments

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### Administrative Information

Agenda

### Opening Session

Advanced Concepts and Technology II Program Overview

Battle Lab Overview

### Session I - Technology Demonstration Topics

Battle Command Battle Labs

Depth & Simultaneous Attack Battle Lab

### Session II - Technology Demonstration Topics

Combat Service Support Battle Lab

Early Entry Lethality & Survivability Battle Lab

### Session III - Technology Demonstration Topics

Dismounted Battlespace Battle Lab

Air Maneuver Battle Lab

Maneuver Support Battle Lab

Mounted Battlespace Battle Lab

## **PRE-PROPOSAL CONFERENCE AGENDA**

APRIL 14-15, 1997  
OMNI NEWPORT NEWS HOTEL  
NEWPORT NEWS, VIRGINIA

TUESDAY, APRIL 15, 1997

0600 REGISTRATION CONTINUES

0745 OPENING SESSION

### **ADMINISTRATIVE REMARKS**

Captain J. G. Byrum

Battle Lab Integration, Technology and Concepts Directorate  
Training and Doctrine Command

0800 INTRODUCTORY REMARKS - USER'S PERSPECTIVE

Brigadier General Robert T. Clark

Deputy Chief of Staff for Combat Developments  
Training and Doctrine Command

0820 INTRODUCTORY REMARKS - DEVELOPER'S PERSPECTIVE

Major General Roy E. Beauchamp

Deputy Chief of Staff for Research, Development & Acquisition  
Army Materiel Command

0840 ADVANCED CONCEPTS AND TECHNOLOGY II PROGRAM OVERVIEW

Dr. Kenneth Gabriel

Chief, Army Research Office - Washington

0920 BATTLE LAB OVERVIEW

Colonel Michael K. Mehaffey

Director, Battle Lab Integration, Technology and Concepts Directorate  
Training and Doctrine Command

### **BREAK**

1030 SESSION I - TECHNOLOGY DEMONSTRATION TOPICS

### **BATTLE COMMAND BATTLE LABS**

Lieutenant Colonel (P) Douglas MacGregor

Deputy Director

Fort Leavenworth, KS

Colonel Reid Huff

Deputy Director

Fort Huachuca, AZ

Mr. Thomas W. Mims

Chief, Technical Assessment Division

Fort Gordon, GA

**DEPTH & SIMULTANEOUS ATTACK BATTLE LAB**

Mr. George Durham  
Assistant Deputy Director

1130 QUESTIONS AND ANSWERS

1200 LUNCH

1330 SESSION II - TECHNOLOGY DEMONSTRATION TOPICS

**COMBAT SERVICE SUPPORT BATTLE LAB**

Colonel Larry W. Matthews  
Deputy Director

**EARLY ENTRY LETHALITY & SURVIVABILITY BATTLE LAB**

Colonel Daniel R. Fake  
Deputy Director

1450 QUESTIONS AND ANSWERS

**DISMOUNTED BATTLESPACE BATTLE LAB**

Mr. Richard Caravana  
Assistant Deputy Director

**AIR MANEUVER BATTLE LAB**

Colonel Gary Coleman  
Deputy Director

**MANEUVER SUPPORT BATTLE LAB**

Colonel Edwin J. Arnold  
Deputy Director

**MOUNTED BATTLESPACE BATTLE LAB**

Mr. David Estes  
Assistant Deputy Director

**BREAK**

1600 DRAFT BROAD AGENCY ANNOUNCEMENT QUESTIONS AND ANSWERS

1615 CLOSING REMARKS

Brigadier General Robert T. Clark  
Deputy Chief of Staff for Combat Developments  
Training and Doctrine Command

**THE OVERALL CLASSIFICATION**

**OF THIS PUBLICATION IS**

**UNCLASSIFIED**

## **NOTICE**

**This publication contains the briefings presented during this Pre-Proposal Conference of the Fiscal Year 98 Advanced Concepts and Technology II (ACT II) Program. Following the Conference, you may obtain a Proceedings Book, for a minimum fee, by contacting the Defense Technical Information Center (DTIC) References Service. The telephone number is 1-800-225-3842, option 5.**

**We hope that the above publication proves beneficial to your participation in the ACT II Program. If you have any additional questions and/or suggestions, please contact the Battle Lab Integration, Technology, and Concepts Directorate, ATCD-B, ATTN: CPT Byrum, (757) 728-5985.**

## **DISCLAIMER**

**The use of trade names in this report does not constitute official endorsement of any products. This report may not be cited for purpose of advertisement.**

**The Pre-Proposal Conference is not to be interpreted as the official ACT II acquisition solicitation (Broad Agency Announcement). Every attempt has been made to provide the most accurate data; however, the ACT II BAA, when released, shall be the official document for proposal preparation and submission information.**



# Army Research Office



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## **ADVANCED CONCEPTS AND TECHNOLOGY II**

### **Program Overview**

**Dr. Kenneth A. Gabriel**  
**Director, Army Research Office - Washington**

*15 April 1997*

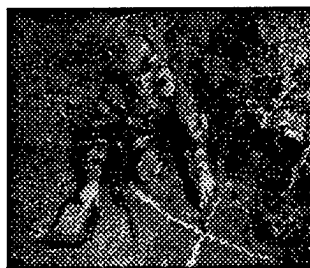


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## **The Vision of ACT II**

*Provide the user with a means to experiment with  
enabling technologies for near-term consideration or transition*

*ACT II is unique in DoD  
by providing a common  
forum for user-developer  
interaction. This enables  
Battle Labs to rapidly  
access technologies and  
demonstrate meaningful  
solutions for our soldiers  
in one year.*



- Transform enabling technologies into user demonstrations in one year ...*
- Provide industry low-cost access to view the user's short term needs ...*
- Enhance the flexibility of Army acquisition.*

# Army Research Office



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## *Program Objectives*

- † **Fund Industry/Academia to Demonstrate Concepts at the Army's Battle Labs**
- † **Encourage Application of New Technology or Technology not Currently Available to the Army**
- † **Transition Successful Technology to End Items or a Regular Funded Army Research and Development Program**
- † **Accelerate the Army's Acquisition Cycle**



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## *The Army's Battle Labs*

- **Battle Command**
- **Mounted Maneuver**
- **Dismounted Maneuver**
- **Aviation**
- **Maneuver Support**
- **Combat Service Support**
- **Depth and Simultaneous Attack**
- **Early Entry Lethality and Survivability**

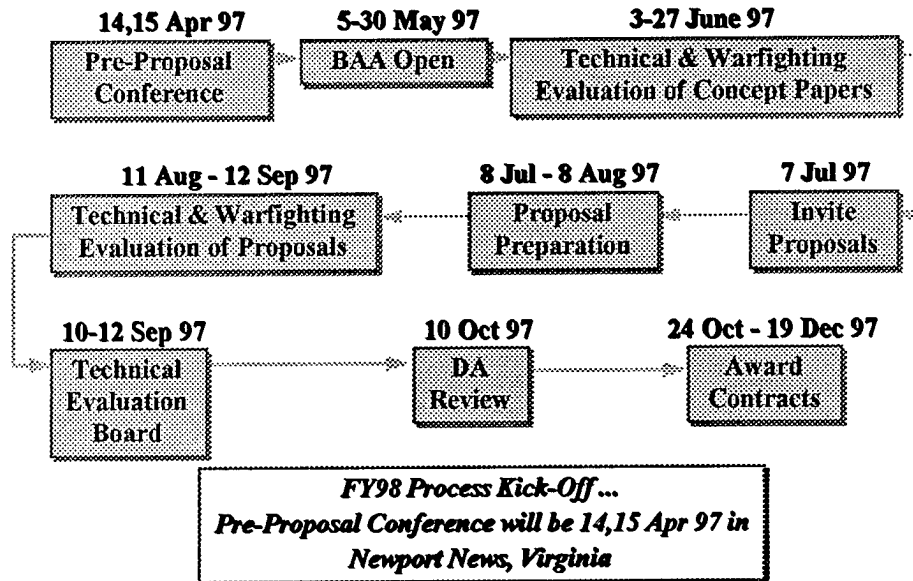


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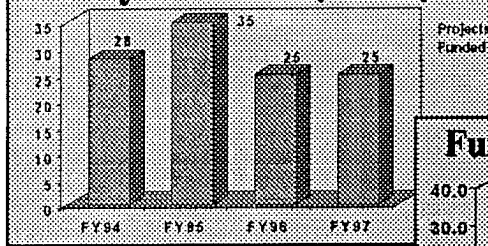
## FY98 Solicitation Process (Planned)



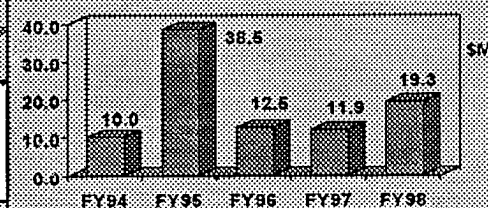
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## The ACT II Program

History ... established by the Army in 1994



### Funding



### Execution

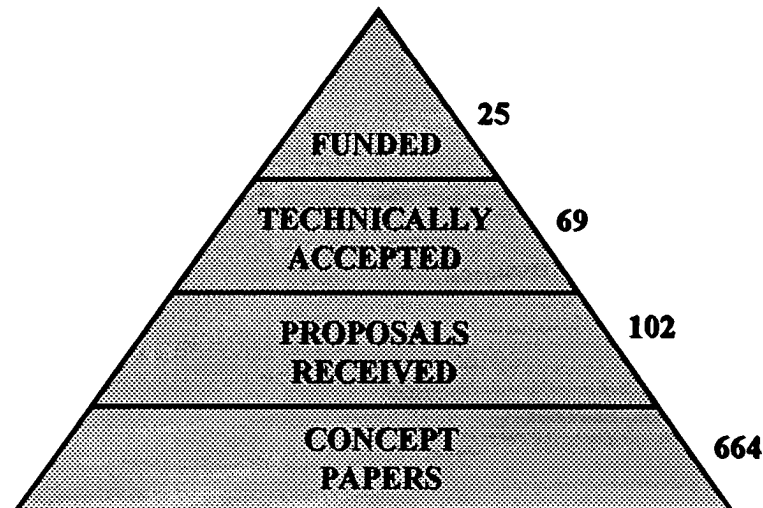
Percent of budgetary outlays in 12 months  
Contract awards in FY97 \$1.5 Million  
Contract with Army Innovation Technical  
Institution

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## ***FY97 ACT II Program***



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## ***The Evaluation Process ...***

### ***Your Part:***

**Step 1: Two-Page Concept Papers**

**Step 2: Full Proposals**

### ***Our Part:***

- **Technical Evaluation**
- **Military Evaluation (weighted heaviest)**
- **Cost Realism**
- **Order-of-Merit Listing**

***... Designed to Reduce Your Burden***

# ***Army Research Office***



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## ***Technical Evaluation Criteria***

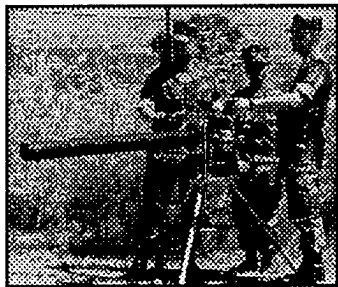
- † Soundness and Technical Merit of the Proposed Approach and its Incremental Progress Toward Topic or Subtopic Solution**
- † Adequacy of the Proposed Effort in Fulfilling the Requirements of the Topic**
- † Qualification of the Proposed Principal Key Investigators, Supporting Staff, and Consultants**
- † Does not Duplicate Current or Previous Efforts**



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## ***Warfighting Capability Criteria***

- † Doctrinal Soundness and the Improvements Proposed in the Topic Area**
- † Reasonableness and Feasibility to Demonstrate the Proposed Topic Areas' Warfighting Capability**

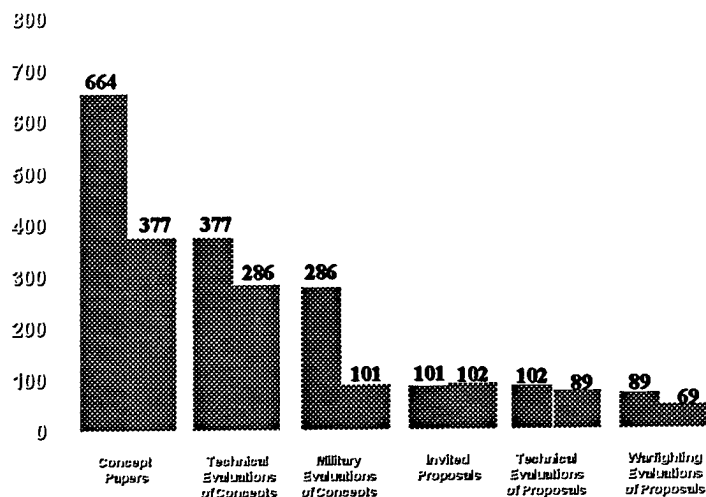


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## ***FY97 ACT II Evaluation Process***



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## ***FY97 Project Summaries***

Proposal	Company	Proposal Title	RDEC
97-BCBL-084	Lucent Technologies Inc	Advanced Party Cellular Communications Support w/VSAT Back-haul Capability	CECOM
97-CSS-018	McDonnell Douglas Aerospace	Integrated Maintenance and Logistics Soldier System	NRDEC
97-DBBL-023	FFE International Inc	Improved Survivability with Holographic IZ Goggles	CECOM
97-DSA-018	Hughes Missile Systems Co	Outrider (Silent Eyes) Imaging Artillery Projectile	ARDEC
97-EELS-039	Rolands and Associates Inc	Integration of IDEAS in JTLS Using Distributed Interactive Simulation Protocol	MICOM
97-LAM-007	Research Triangle Institute	Trauma Patient Simulation	MRMC
97-MTD-009	Lockheed Martin Vought Systems Corp	Virtual Prototype for Future Scout Systems	TARDEC
97-BCBL-073	Mystech Associates Inc	Implementation of "Knowbots" on the Tactical Internet	CECOM

# Army Research Office



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## ***FY97 Project Summaries (Con't)***

Proposal	Company	Proposal Title	RDEC
97-CSS-117	Mobile Datacom Corp	Integrated MTS Technologies and Radio Frequency Tagging	CECOM
97-DBBL-079	Monterey Bay Corporation	Paintball-based Underbarrel Non-Lethal Weapon System	ARDEC
97-DSA-071	McDonnell Douglas Aerospace	Enhanced Combat Identification	MICOM
97-EELS-048	Northrop Grumman Corp	Use of Programmable Digital Radio for High Data Rate Tactical Wireless Comm Link	CECOM
97-MTD-082	Lockheed Martin Electro Optical Sys Inc	Semiconductor Laser Directional IRCM	CECOM
97-BCBL-075	Mystech Associates Inc	Federation of Existing RISTA Models	STRICOM
97-CSS-139	Morris Brown College, CERT	Competitive Algorithms for Computerized Training	ARI
97-DBBL-107	Chain Reactions Inc	Advanced Membrane Transducer for Increased Flexibility	CECOM



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## ***FY97 Project Summaries (Con't)***

Proposal	Company	Proposal Title	RDEC
97-DSA-047	Syracuse Research Corp	Distributed Interactive Simulation of Weapons Location Radar	CECOM
97-CSS-158	Trustees of Boston University	Chemical Agent Water Monitor	ERDEC
97-DSA-048	General Dynamics Land Systems	SINCGARS High Data Networking Radio	CECOM
97-EELS-019	Harris RF Communications	High Data Rate Long-Range HF Communication System with Scalable Waveforms	CECOM
97-EELS-016	Physical Optics Corporation	Autonomous Remote Chem-Bio Agent Sensor	ERDEC
97-MTD-115	Optimetrix Inc	Development of Distributed HK Avoidance Analysis Tool	TARDEC
97-CSS-082	Advanced Communications Systems Inc	Combat Service Support Command, Control, Communications and Automation Integration	CECOM
97-CSS-093	John Hopkins University	Non-Invasive Portable Imaging System for Casualty Monitoring	MRMC
97-DBBL-108	Powell River Laboratory	Precision Munitions	ARDEC

## *Battle Labs -- an Overview*



# **TRADOC**

## ***Battle Lab Integration***

### **Battle Lab Overview**

*Presented by*

**COL Michael K. Mehaffey**

**Director, Battle Lab Integration, Technology and Concepts Directorate  
Deputy Chief of Staff for Combat Developments  
Headquarters, US Army Training and Doctrine Command**



## ***Battle Labs***

### **Why Battle Labs?**

- The need to experiment
- Changes in strategy, policy & resources
- Changes in doctrine
- Methods of warfare are changing
- Tactically savvy soldiers & leaders
- Technology opportunities (especially info '3)
- Provide sheltered institution for examining change

*Established  
in  
May 1992*

Historical  
underpinnings



Glimmerings  
of future battle

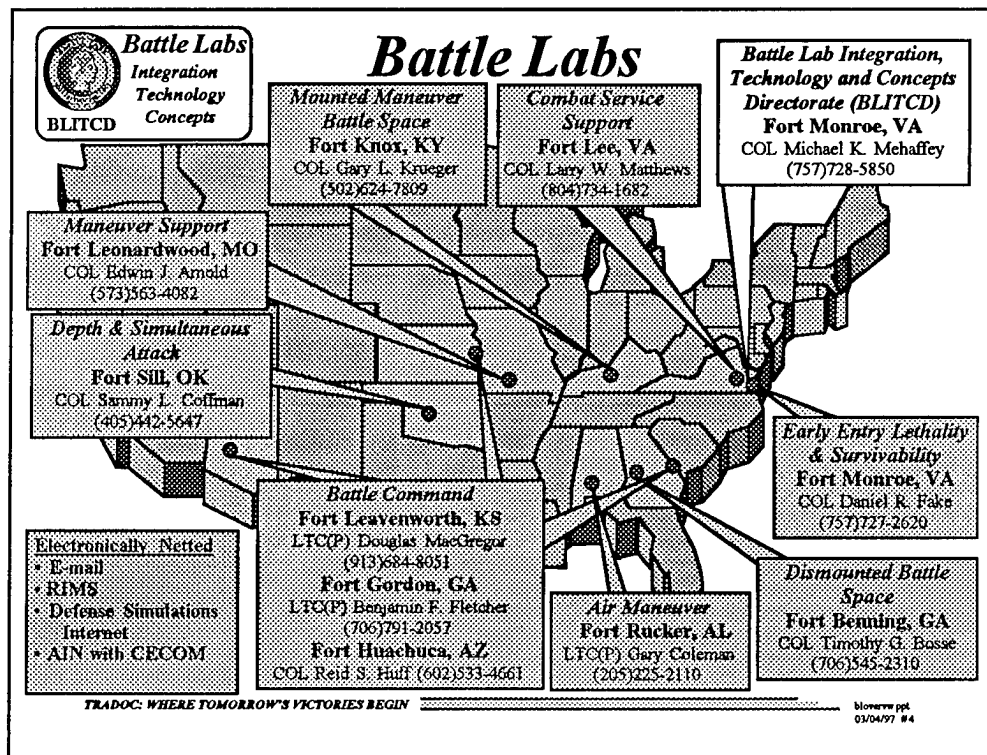
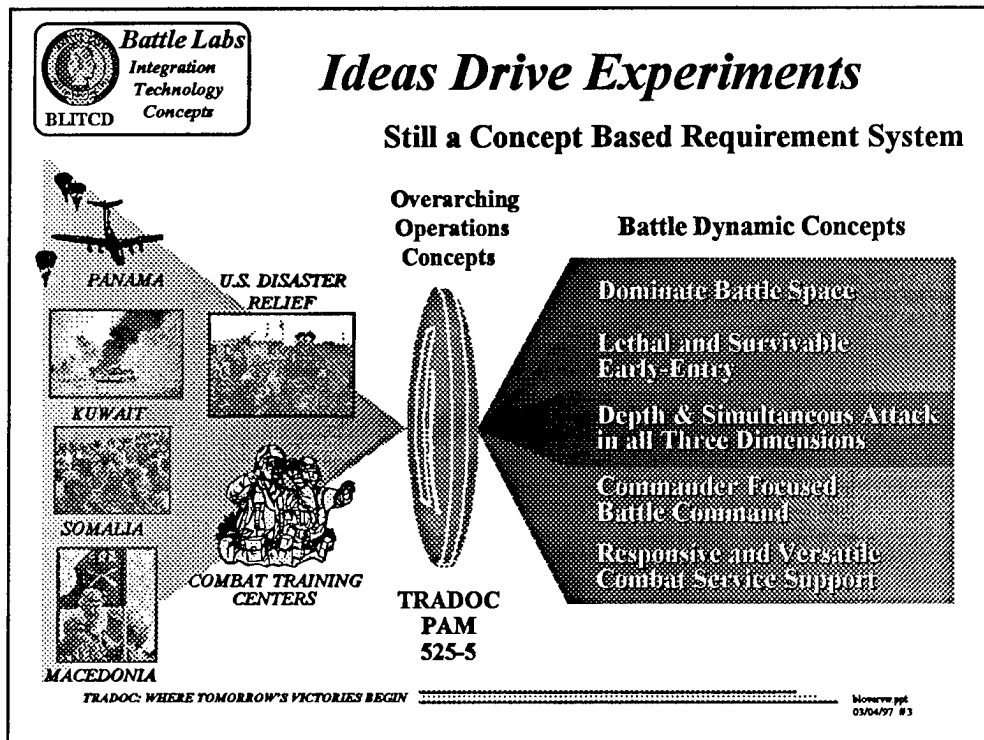
***Operational Enhancements  
for deployed soldiers today!***

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

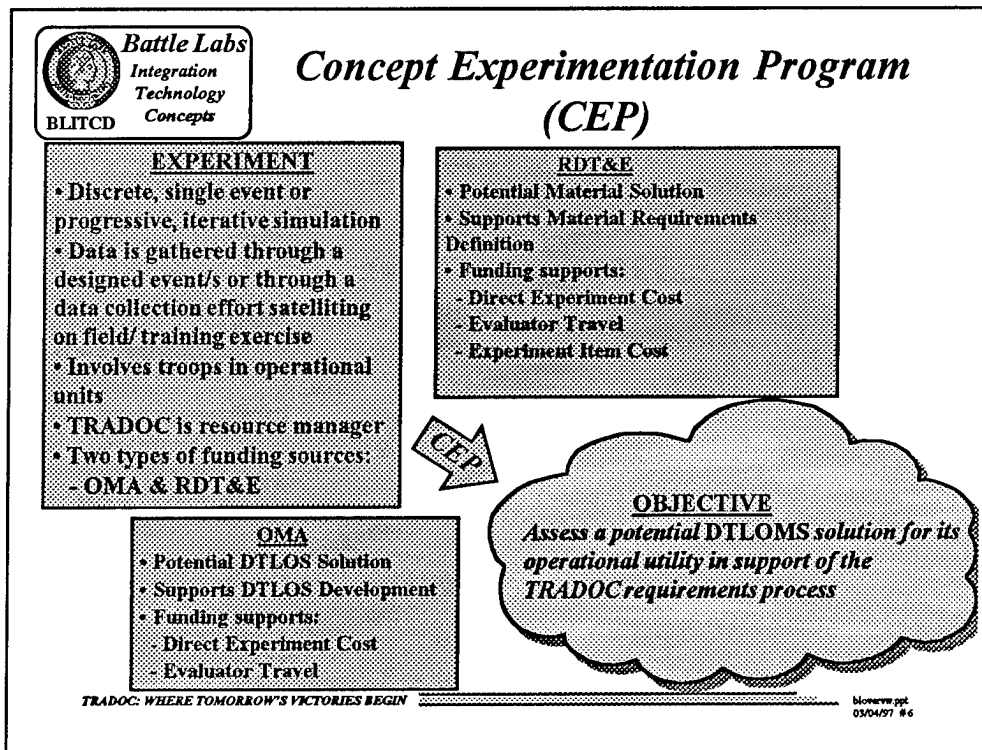
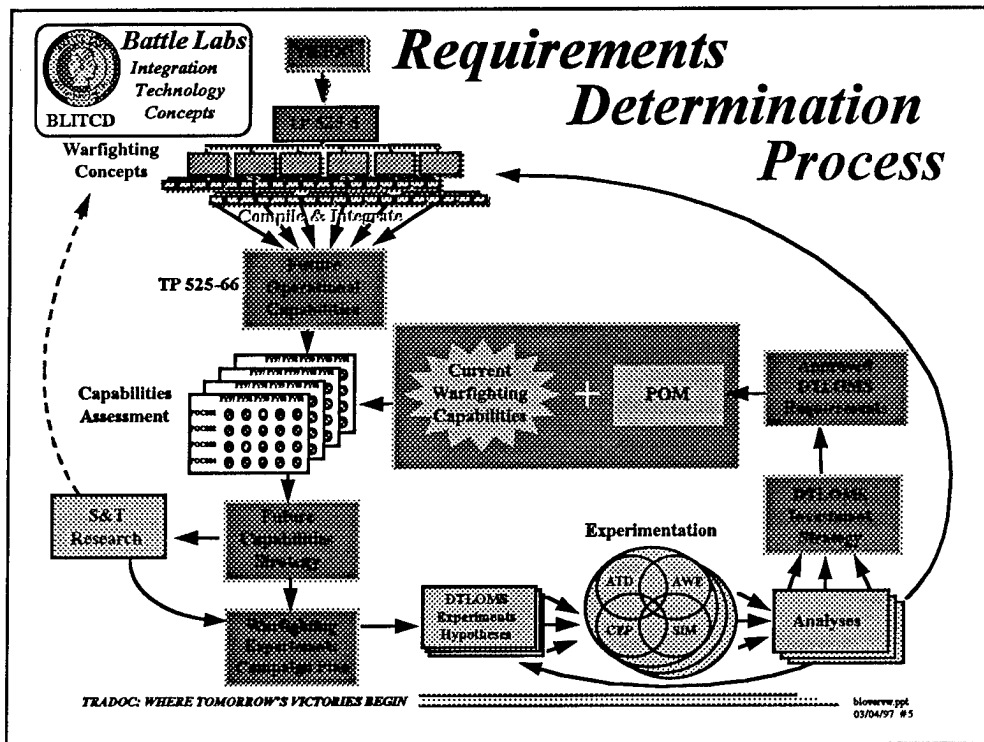
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# Battle Labs -- an Overview



## Battle Labs -- an Overview



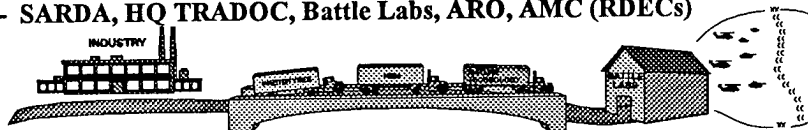
## Battle Labs -- an Overview



**Battle Labs**  
Integration  
Technology  
Concepts

### Advanced Concepts and Technology II (ACT II) Program

- Provides industry interaction with Battle Labs
  - Funding
  - Simplified Procedure
  - Mature Technologies
  - Non-developmental Items (NDI)
  - Prototypes
- Battle Labs and Proponents solicit highest priority FOC needs via a Broad Agency Announcement
- Army Research Office serves as TRADOC's executive agent
- Selection Process Participants:
  - SARDA, HQ TRADOC, Battle Labs, ARO, AMC (RDECs)



TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

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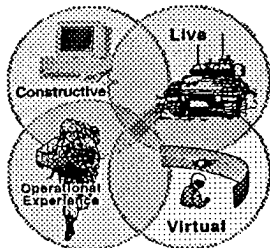
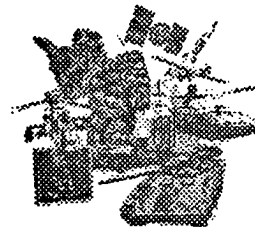


**Battle Labs**  
Integration  
Technology  
Concepts

### Battle Laboratory Experiment (BLE)

#### EXPERIMENT

- Discrete, single event or progressive, iterative simulation
- Proponent and/or Battle Lab managed sponsorship
- Quick analysis of an issue
- Follows same requirements for experimentation planning and reporting as CEPs



#### FUNDING


- By sources other than the CEP (school discretionary funds or by funding from another government agency)
- Low cost





TRADOC: WHERE TOMORROW'S VICTORIES BEGIN



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03/04/97 #8

## Battle Labs -- an Overview



**Battle Labs**  
Integration  
Technology  
Concepts  
BLITCD

**Doctrine  
Training  
Leader  
Development  
Organizations  
Materiel  
Soldiers**


### Advanced Warfighting Experiments

... are Center of Gravity culminating efforts, focused on major increases to warfighting capabilities across the Battlefield Dynamic and Battlefield Operating Systems

- ✓ Sponsored by HQ TRADOC or Battle Lab
- ✓ Broad in scope
- ✓ Multi-faceted simulations:
  - Tactically competitive environments
  - Progressive & iterative
  - Relevant scenarios
- ✓ Field soldiers and units
- ✓ Begins with hypothesis – works with issues and initiatives
- ✓ Combined Arms, horizontal look across the force
- ✓ Will yield ideas/results/technology:
  - that we keep... and invest in
  - discard
  - experiment further with

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

blowrve ppt  
03/04/97 #9



**Battle Labs**  
Integration  
Technology  
Concepts  
BLITCD

### Advanced Technology Demonstration (ATD)

**DESCRIPTION**

- S&T funded
- Conducted in operational versus laboratory environment
- Defined exit criteria
- Transition into system improvements or R&D programs
- Performance period intended to be 3 - 5 years

**EXECUTION**

- SARDA approves and resources
- Battle Labs manage sponsorship and provide horizontal integration across the battlefield dynamics

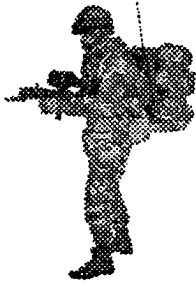
FY 93  
Battlefield Combat Identification  
Intelligent Minefield

FY 94  
Composite Armored Vehicle  
Hunter Sensor Suite

FY 95  
Target Acquisition  
Guided MLRS

FY 96  
Vehicle Mounted Mine Detector  
Integrated Biodeflection

FY 97  
Battlespace Command and Control  
Rapid Battlefield Visualization



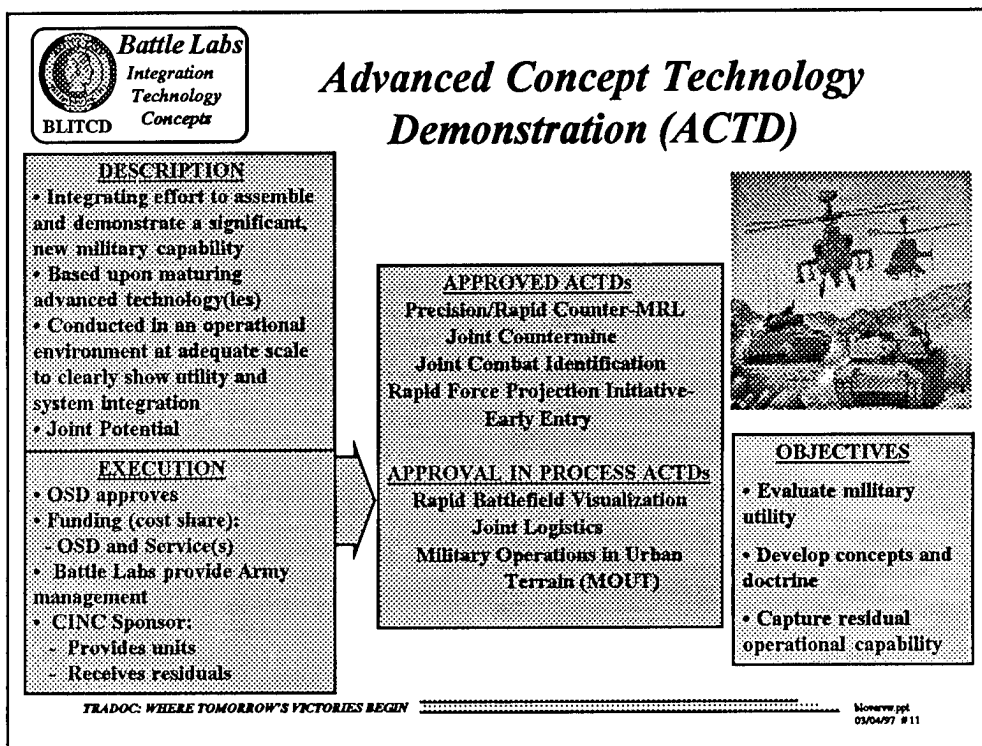
**OBJECTIVE**


Evaluate technical performance against developed exit criteria

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

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## Battle Labs -- an Overview






**Battle Labs**  
Integration  
Technology  
Concepts

### Battle Labs...Agents of Change

*"Requirements Determination Process / Acquisition"*

- Battle Labs methodology being explored by other Services
- British and Germans establishing their own labs
- Demonstrated reductions in cost, risk and fielding timelines of advanced capabilities
- Advanced capabilities provided to Contingency Forces



The only thing harder than getting a new idea into the military mind is to get the old one out.

*B.H. Liddell Hart*

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

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***Battle Command Battle Lab - Ft. Leavenworth***

**TERRAIN EVALUATION  
FUNCTIONALITY SOFTWARE (TEF)  
FOR THE ARMY BATTLE COMMAND  
SYSTEM (ABCS)**

**LTC(P) DOUGLAS MACGREGOR  
DEPUTY DIRECTOR  
BATTLE COMMAND BATTLE LAB  
FORT LEAVENWORTH, KS**

**UNCLASSIFIED**

**TERRAIN EVALUATION  
FUNCTIONALITY SOFTWARE  
(TEF) FOR THE ARMY BATTLE  
COMMAND SYSTEM (ABCS)**

**TAILORABLE AND SCALABLE  
“WARFIGHTER” TERRAIN EVALUATION  
SOFTWARE MODULE TO INCORPORATE  
WITHIN EACH UNIQUE ABCS  
COMPONENT. DUAL USE CAPABILITY TO  
SUPPORT TERRAIN EVALUATION  
TRAINING IN TRADOC SCHOOLS.**

## ***Battle Command Battle Lab - Ft. Leavenworth***

### **TEF SOFTWARE FOR ABCS**

- VALIDATE ARMY RQMTS FOR JMTK
- TARGET USER IS WARFIGHTER
- SCALABLE AND TAILORABLE TO BOS'es
  - \* CTIS, MCS, ASAS, CSSCS, AFATDS, FAADC2I, FBCB2
  - \* CTIS PROVIDES DATA SETS & COMPLEX ANALYSES
- CAPABLE OF USING MULTIPLE DATA SETS
- UNIX, WINDOWS 95, WINDOWS NT CAPABLE
- INCORPORATE TACTICAL WEATHER EFFECTS
- DUAL USE TERRAIN EVALUATION TRAINING
- DEVELOPMENT AT MSBL AND BCBL-L

## ***Battle Command Battle Lab - Ft. Leavenworth***

### **INNOVATIVE, INTERACTIVE, AND COLLABORATIVE MOBILE VISUALIZATION FOR BATTLE COMMAND**

**DESIGN, DEVELOP, AND TEST PROTOTYPE  
VISUALIZATION TECHNOLOGY FOR  
UNTETHERED WARFIGHTER IN STATIC AND  
MOBILE TACTICAL OPERATION CENTERS**

### **INNOVATIVE, INTERACTIVE, AND COLLABORATIVE MOBILE VISUALIZATION FOR BATTLE COMMAND**

- SIGNIFICANTLY REDUCE VOLUME, WEIGHT,  
& POWER REQUIREMENTS**
- MULTIPLE INTERFACE CAPABILITY**
- MAINTAIN REQUIRED MAP RESOLUTION**
- BRIGHTNESS AND CONTRAST ACCEPTABLE**
- MINIMAL NAUSEAU EFFECTS WHILE MOBILE**
- UNTETHERED CAPABILITY FROM CPU**
- TESTING & EVALUATION AT FT. LEAVENWORTH**



## ***Battle Command Battle Lab - Ft. Huachuca***

### **Common Battalion-Level Battle Command System**

**COL Reid Huff  
Deputy Director  
Battle Command Battle Lab (Huachuca)**

**UNCLASSIFIED**

### **Common Battalion-Level Battle Command System**

- **Objective**

**Develop a simplified prototype system that satisfies cross-Battlefield Functional Area (BFA) needs and the unique limitations of battle command at the maneuver battalion level.**

**Intent of the project is accelerated requirements definition and concept exploration with a focus on assessing the feasibility and desirability of adopting such a specialized capability for the battalion echelon.**

## ***Battle Command Battle Lab - Ft. Huachuca***

### **Common Battalion-Level Battle Command System**

- **Problem**

- “One size fits all” design philosophy
- Key messaging / database vertical BFA integration processes relative to Maneuver BN

### **Common Battalion-Level Battle Command System**

- **Approach**

- Select essential ATCCS capabilities
- Evolve to a simplified BN prototype that supports proven integrated staff processes
- Use ASAS-RWS Version 3 as candidate system
  - COE / CHS compliant migration path
  - Can host ASAS & MCS functionality
  - Supports immediate software re-use

## ***Battle Command Battle Lab - Ft. Huachuca***

### **Common Battalion-Level Battle Command System**

- **ACT II Focus: Four Primary Requirements**
  - Integrated process through use of common tools
  - Common dynamic overlay exchange in lieu of messaging
  - Graphics & database interface / info exchange
  - Training

### **Common Battalion-Level Battle Command System**

- **Integrated Process Through Use of Common Tools**
  - Automated IPB  
(Intelligence Preparation of the Battlespace)
  - Common tools for enemy & friendly  
Courses of Action (COA) development
  - Decision support template
  - Battlefield Operation System (BOS)  
synchronization / execution matrix
  - Execution matrix linked to battle tracking

## ***Battle Command Battle Lab - Ft. Huachuca***

### **Common Battalion-Level Battle Command System**

- **Common Dynamic Overlay in Lieu of Messaging**
  - Distribution of core operations & intelligence graphics
  - Automated data-basing of user-selected graphics
  - Two-way, multi-node, automated overlay updates
  - Direct interface with Appliqué

### **Common Battalion-Level Battle Command System**

- **Graphics & Database Interface / Info Exchange**
  - Significantly downsized database  
...supports map icon placement
  - Capability to receive full download from higher echelons
  - Database info generated from icons & vice versa
  - Generate graphics which generate database records

## ***Battle Command Battle Lab - Ft. Huachuca***

### **Common Battalion-Level Battle Command System**

- **Training**

- Inherently merges & trains Operations & Intelligence
- 5 days max to train an integrated S-2/3 audience
- Graphical focus minimizes training complexities

### **Common Battalion-Level Battle Command System**

- **Contractor Development Environment**

- Development will occur on-site at Ft. Huachuca at the Battle Command Battle Lab (Huachuca) Battle Technology Laboratory facility
- GFE: Source code
- GFE: Development work station platform, All-Source Analysis System Remote Workstation (ASAS-RWS), Version 3

## ***Battle Command Battle Lab - Ft. Huachuca***

### **THE EMPLOYMENT OF MICROELECTRONIC SENSORS AND GROUND ROBOTIC VEHICLES TO ENHANCE ISR MISSIONS**

**Definition:** The demonstration of microelectronic sensors onboard ground robotic or tele-operated vehicles to enhance and diversify ground intelligence collection capability.

### **THE EMPLOYMENT OF MICROELECTRONIC SENSORS AND GROUND ROBOTIC VEHICLES TO ENHANCE ISR MISSIONS**

#### **REQUIRED COLLECTION:**

- Modern communications and non-communication signals
- Threat system data
- Terrain, environmental, & weather parameters
- NBC threats
- Theater Missile Attack
- Battle Damage Assessment
- Search underground pipelines

## ***Battle Command Battle Lab - Ft. Huachuca***

### **THE EMPLOYMENT OF MICROELECTRONIC SENSORS AND GROUND ROBOTIC VEHICLES TO ENHANCE ISR MISSIONS**

#### **SENSOR REQUIREMENTS:**

- Collection against various signatures - electronic, visual, thermal, magnetic, acoustic, movement
- ATR recognition capabilities
- Easily reprogrammable via distributed means
- Electronic tagging capabilities
- Address cosite mitigation concerns

### **THE EMPLOYMENT OF MICROELECTRONIC SENSORS AND GROUND ROBOTIC VEHICLES TO ENHANCE ISR MISSIONS**

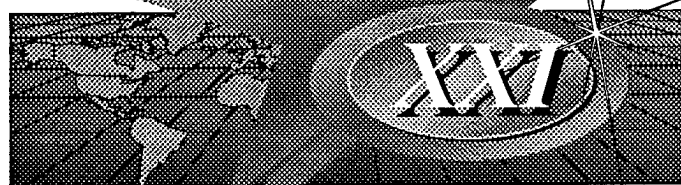
#### **VEHICLE REQUIREMENTS:**

- Small
- Control system design
- Information feedback and presentation
- Controller interface
- Maneuverability
- Obstacle avoidance

# Battle Command Battle Lab - Ft. Gordon

America's Army

## Warfighter Information Network



Thomas W. Mims  
Chief, Technology Assessment Division  
Battle Command Battle Lab  
United States Army Signal Center  
Fort Gordon, Georgia

ACT- II Pre-Proposal Conference  
14-15 April 1997

"Key Leg of the Strategic Triad"

1

America's Army

## WIN Defined

### Warfighter Information Network (WIN) Concept:

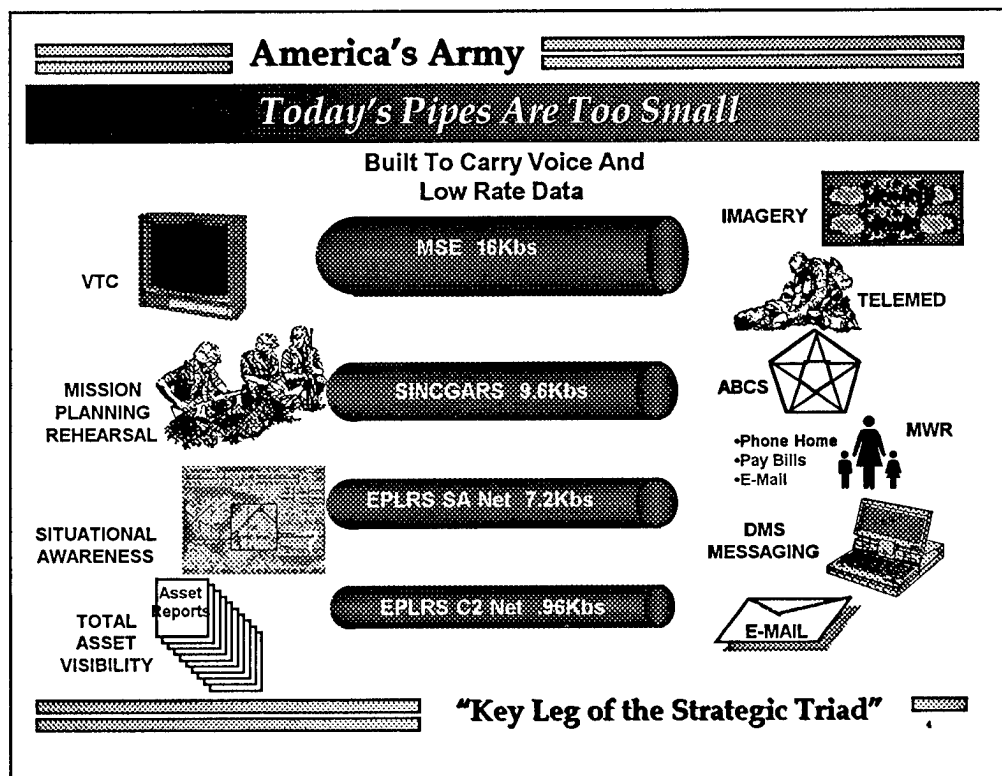
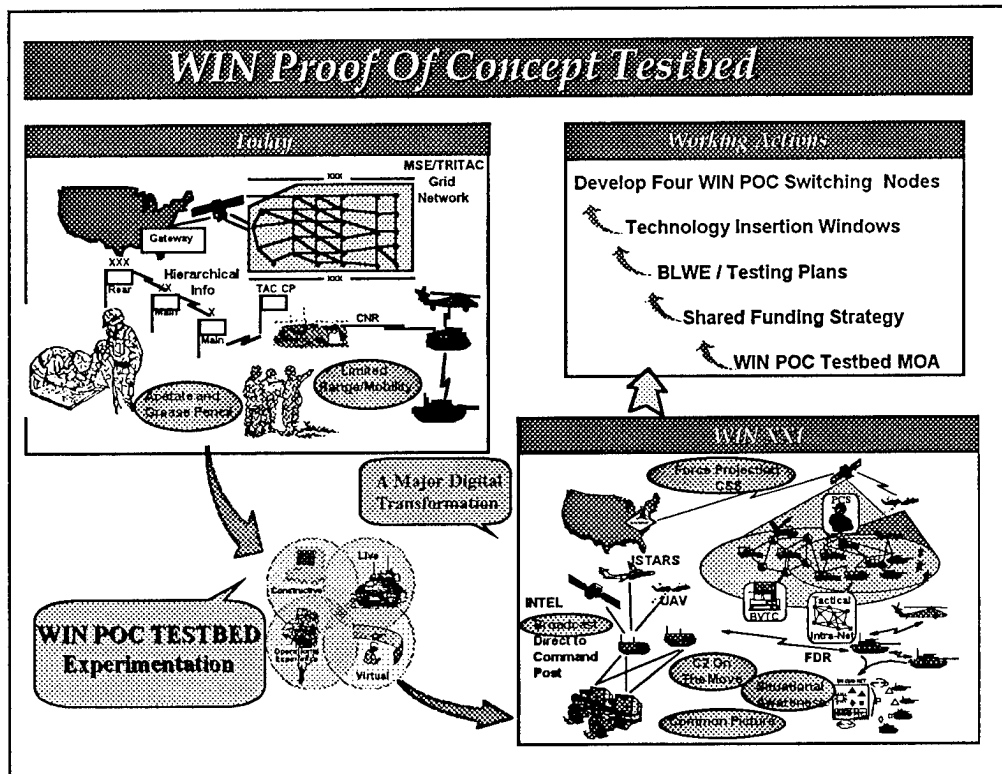
An Evolving Integrated C4 Network that is Comprised of Commercially Based, High Technology Information and Communication Systems. WIN is Designed to Increase the Capacity and Velocity of Information Distribution Throughout the Battlespace in Order to Gain Information Dominance. WIN will Maximize Information Services for the Warfighter and Support the Power Projection Force of the 21st Century from Sustaining Base to Fighting Platform.

"Key Leg of the Strategic Triad"

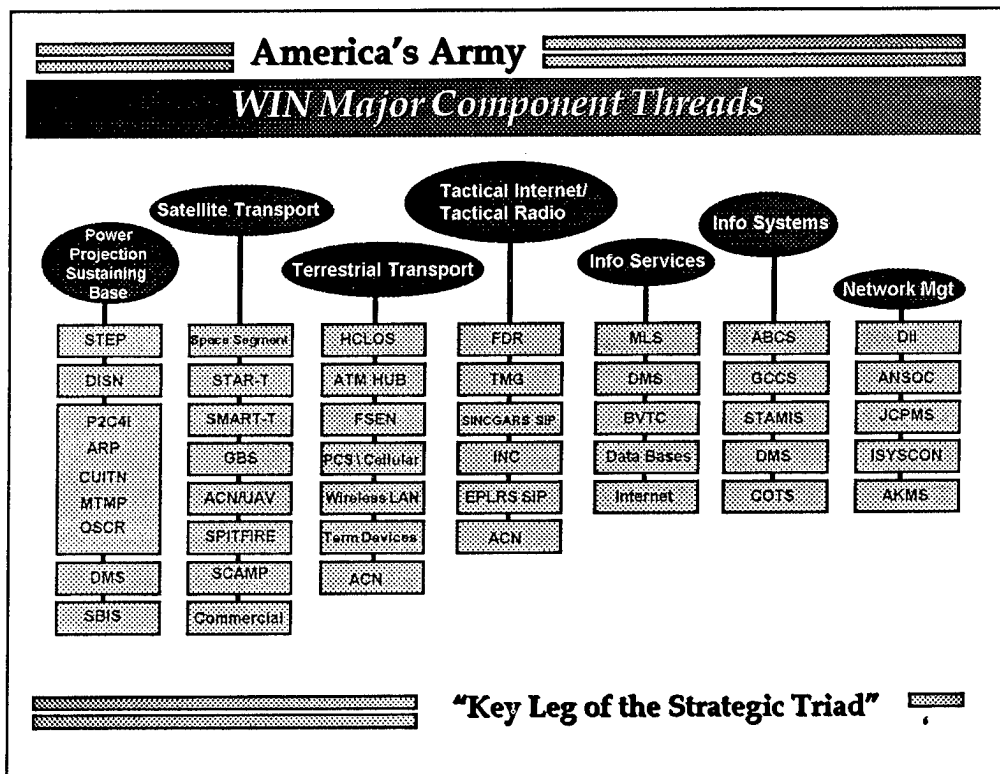
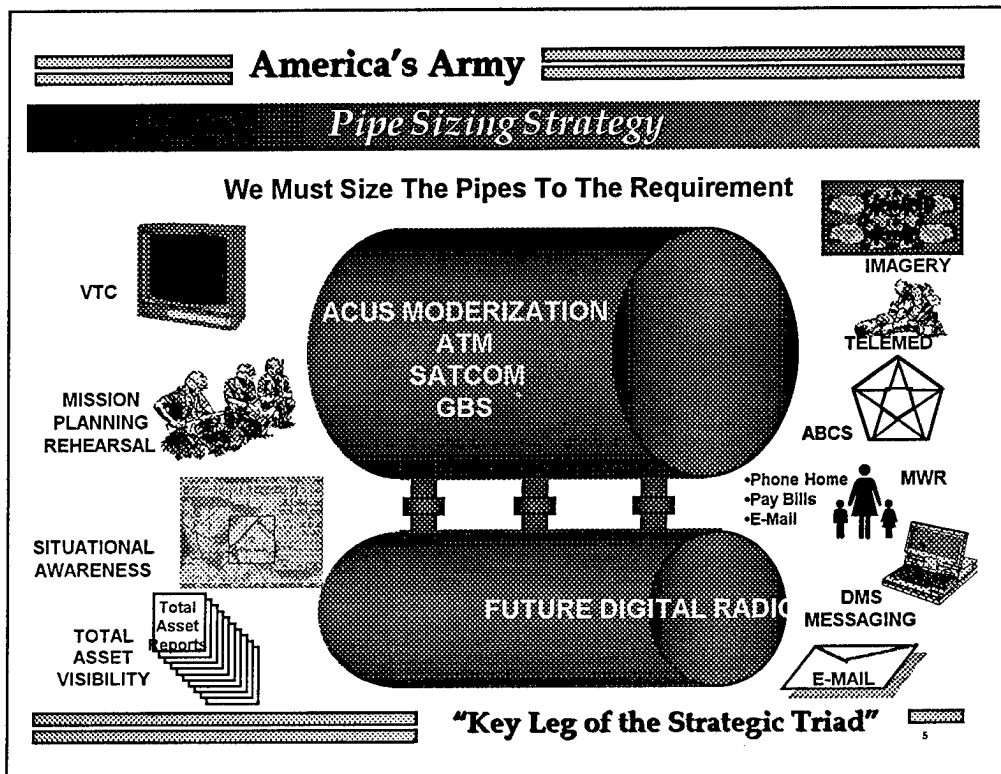
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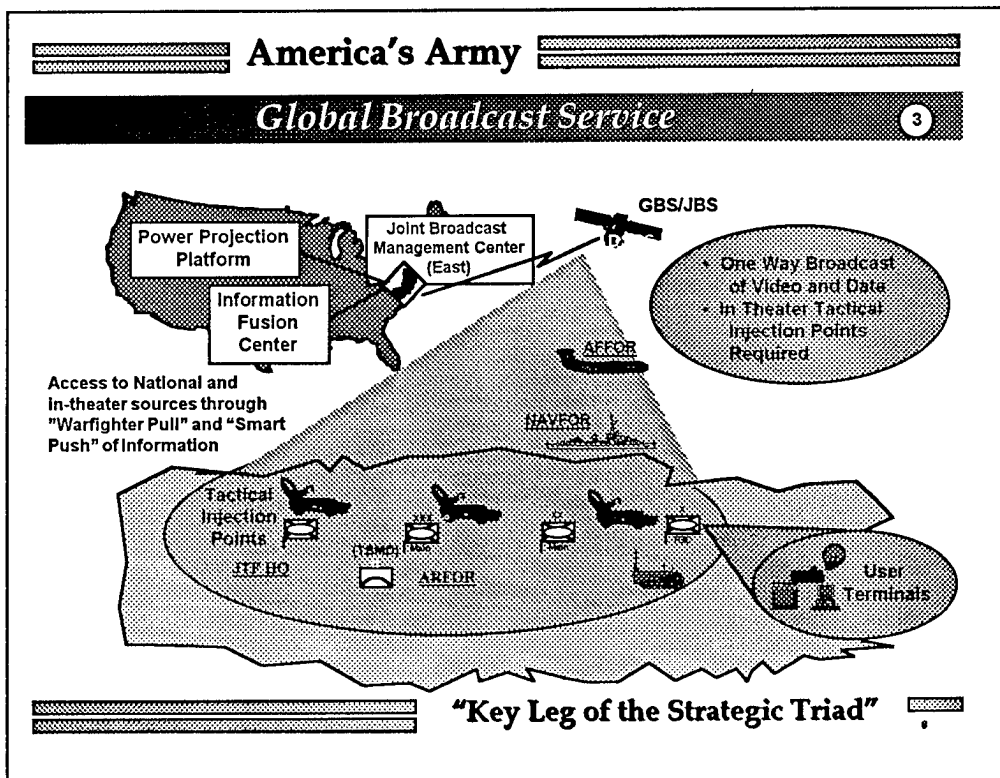
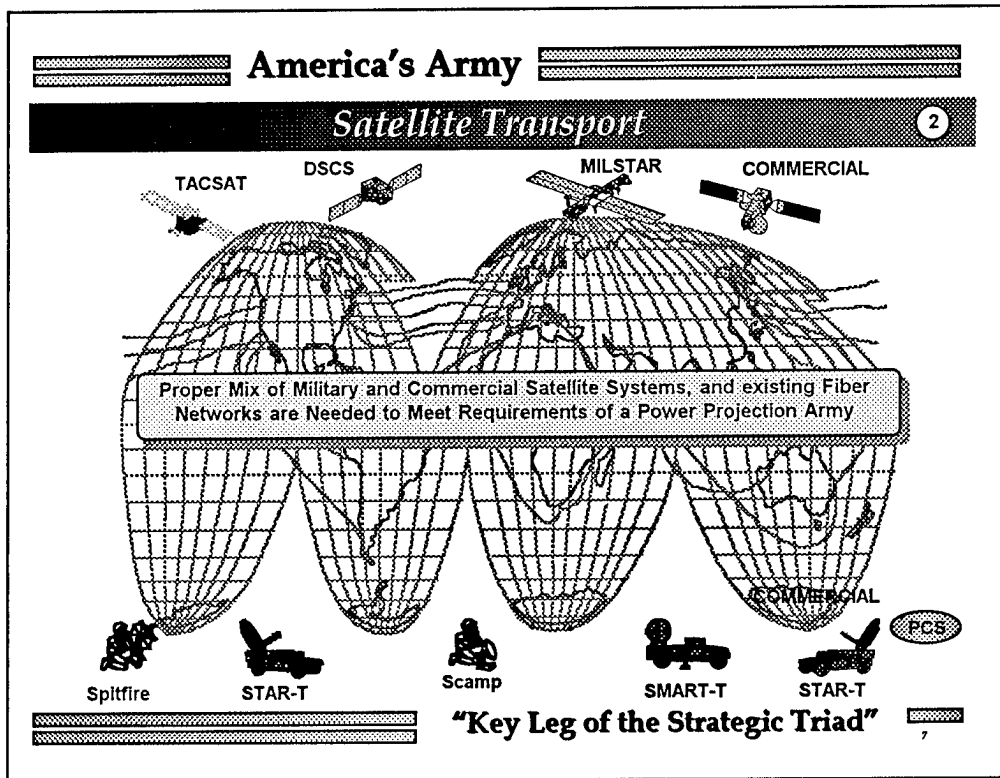
# Battle Command Battle Lab - Ft. Gordon



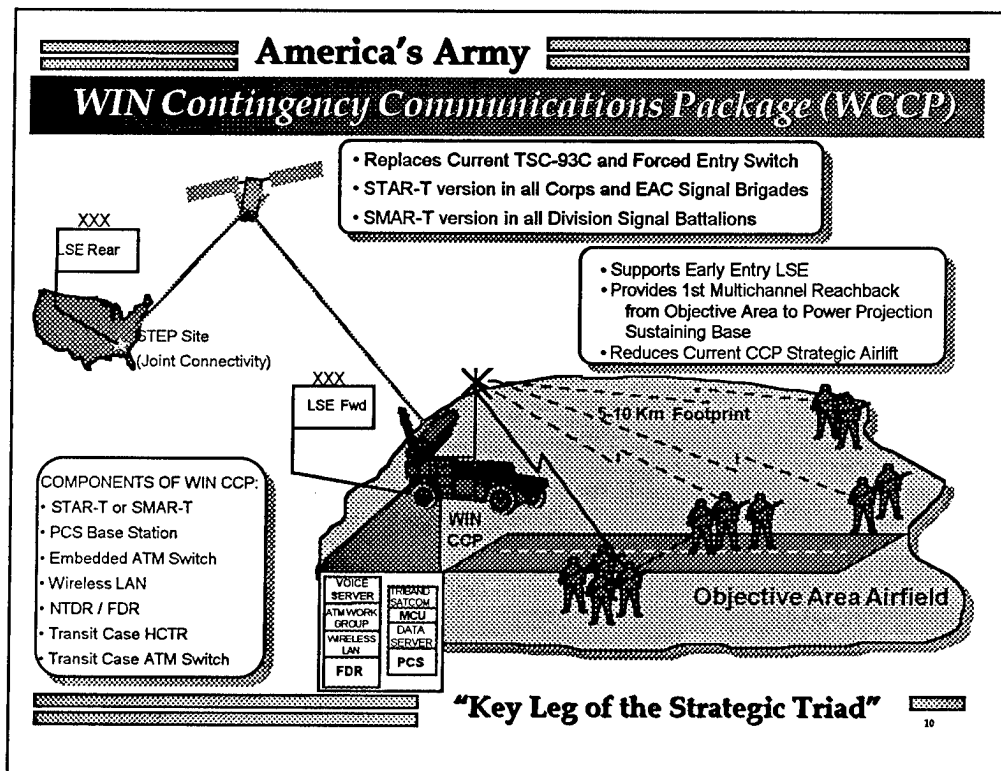
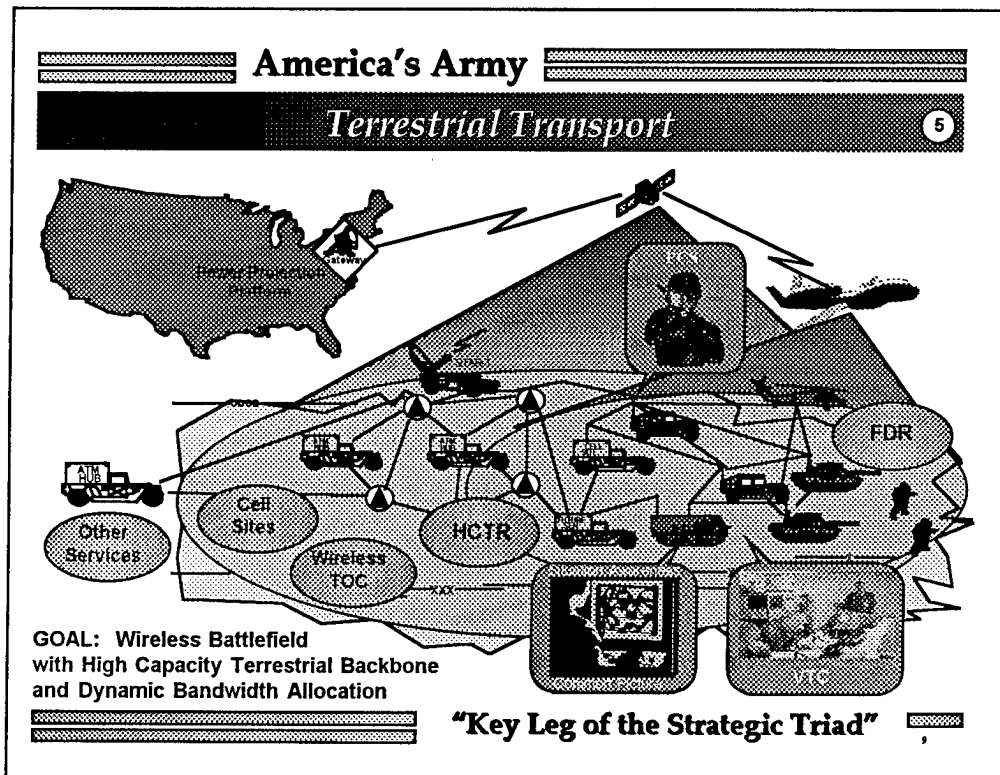
# Battle Command Battle Lab - Ft. Gordon



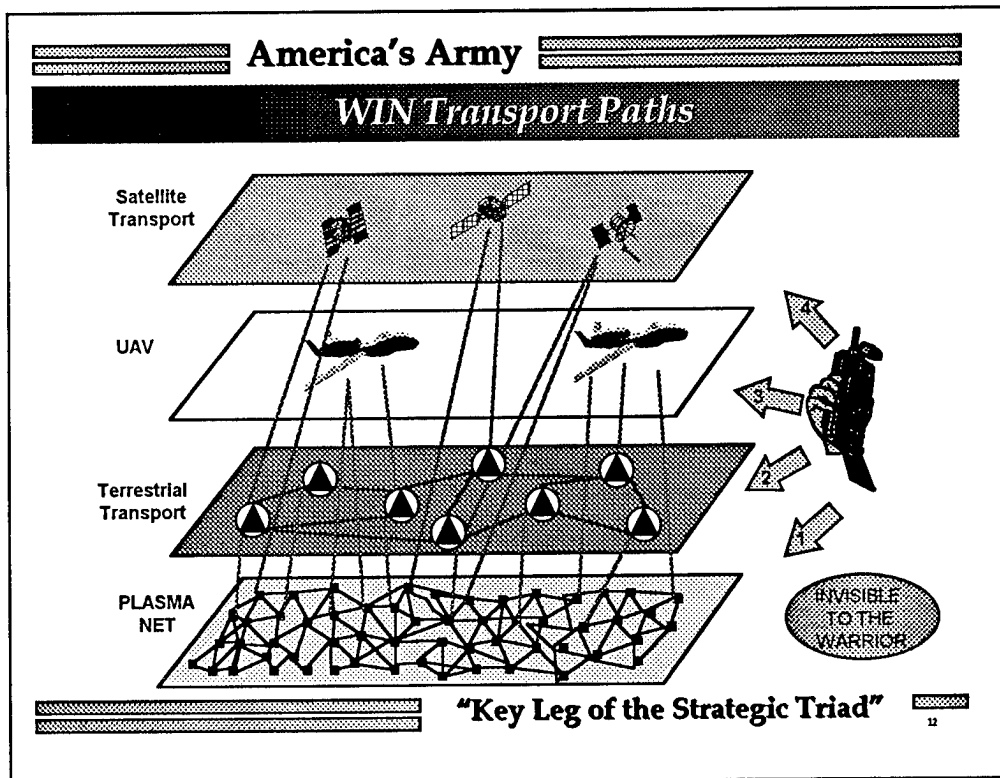
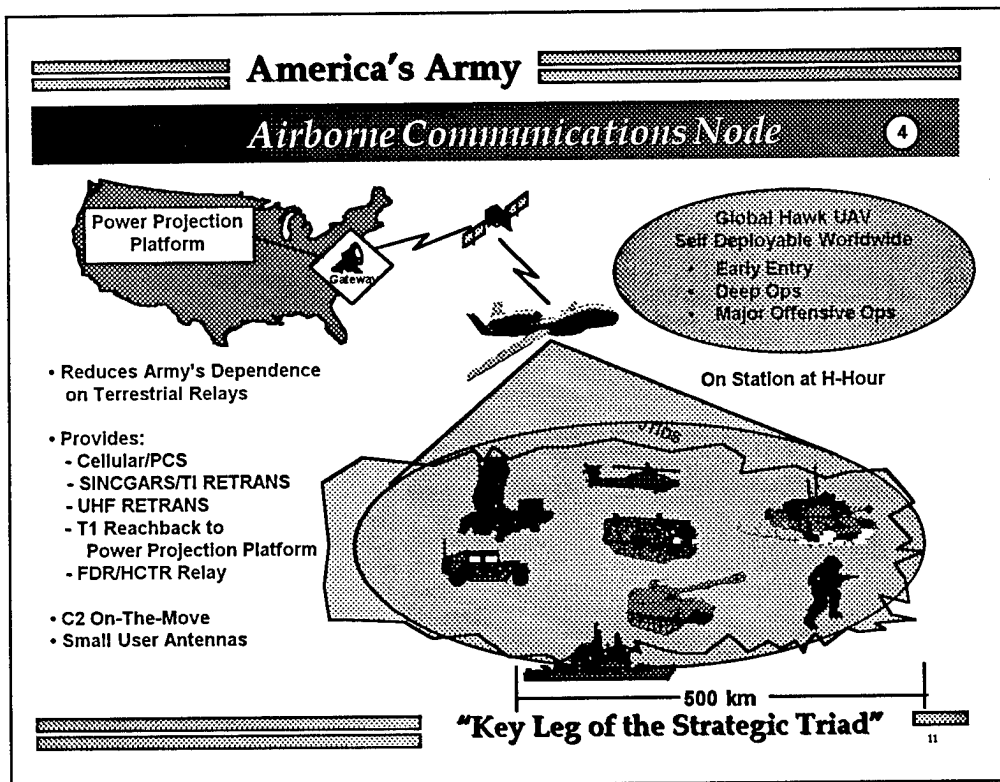
# Battle Command Battle Lab - Ft. Gordon



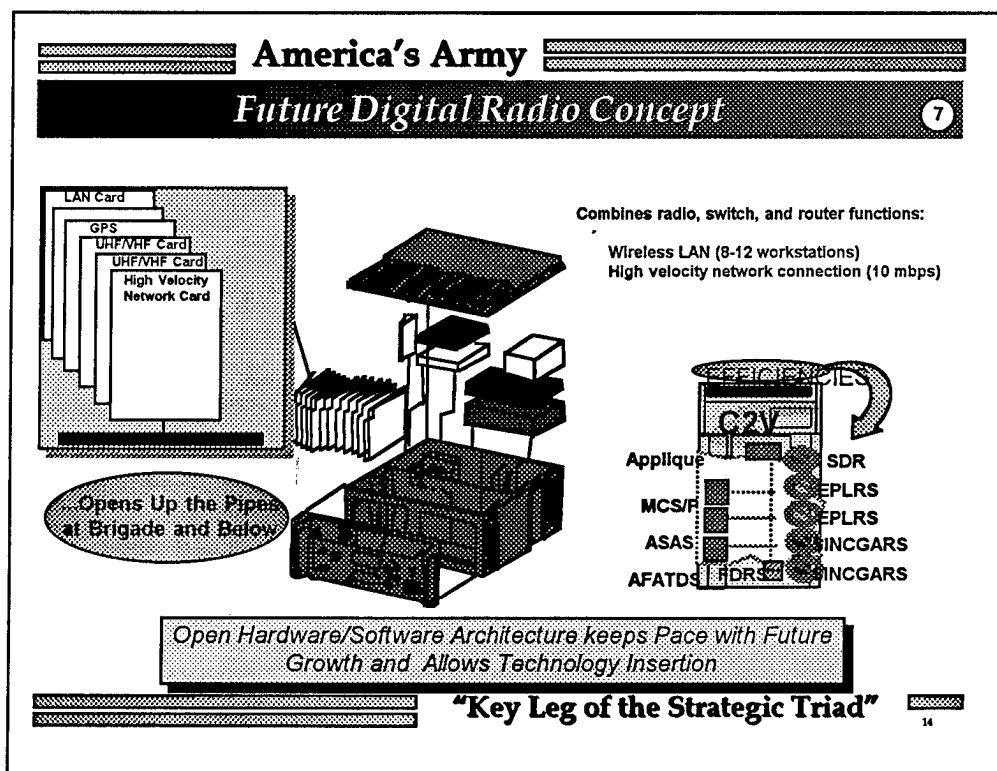
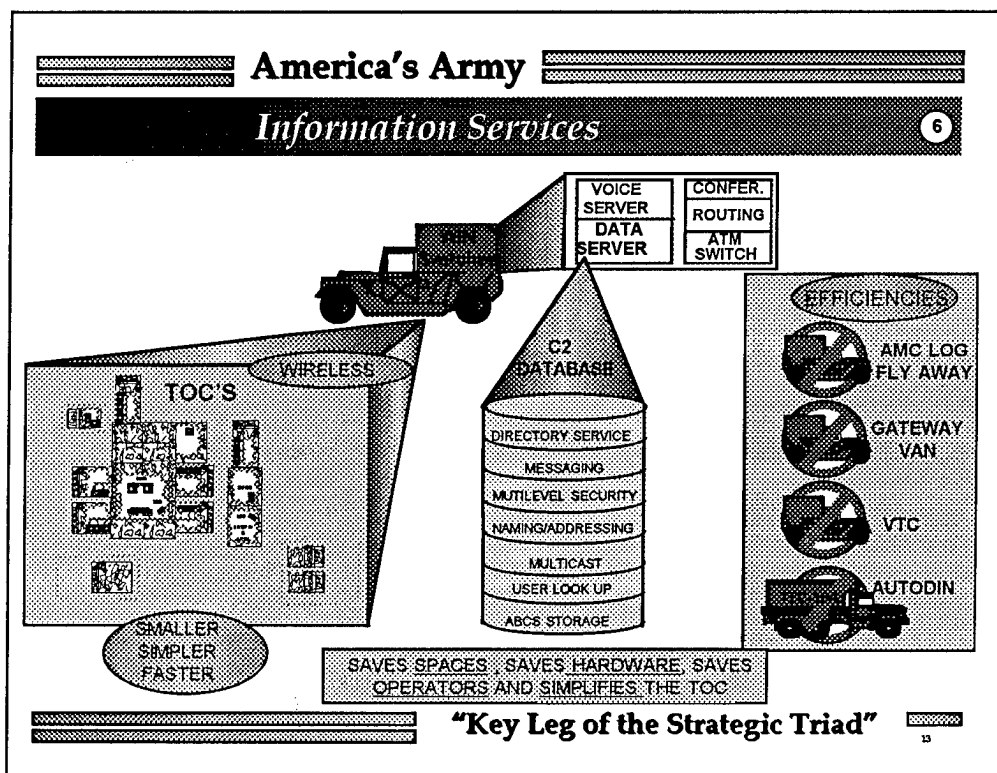
# Battle Command Battle Lab - Ft. Gordon



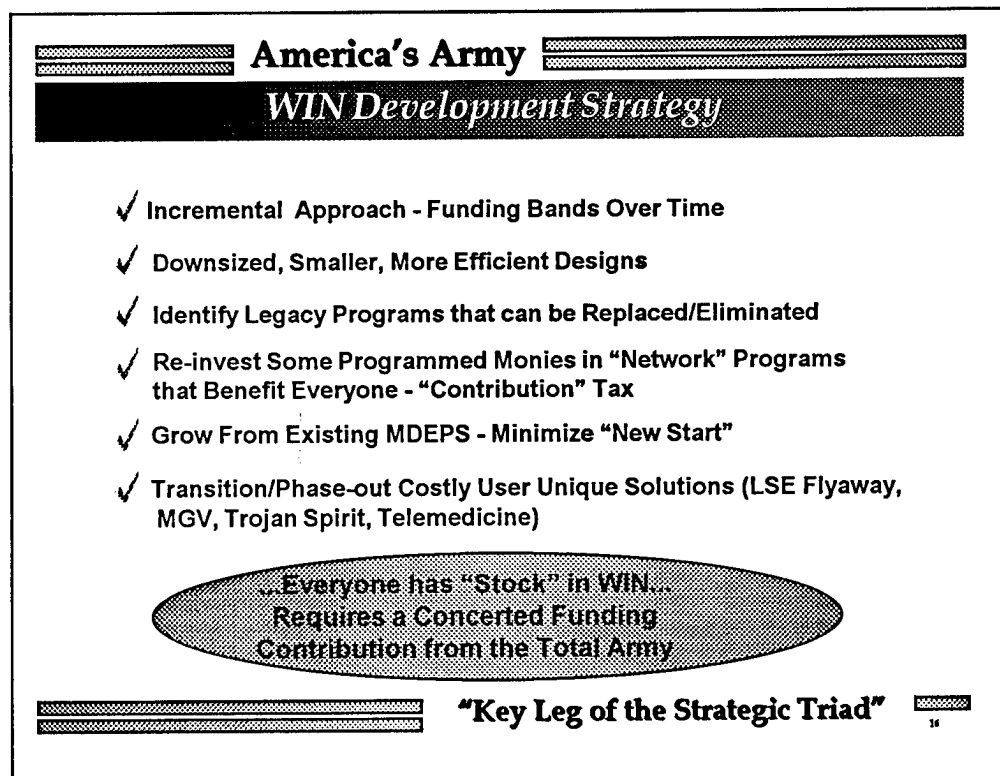
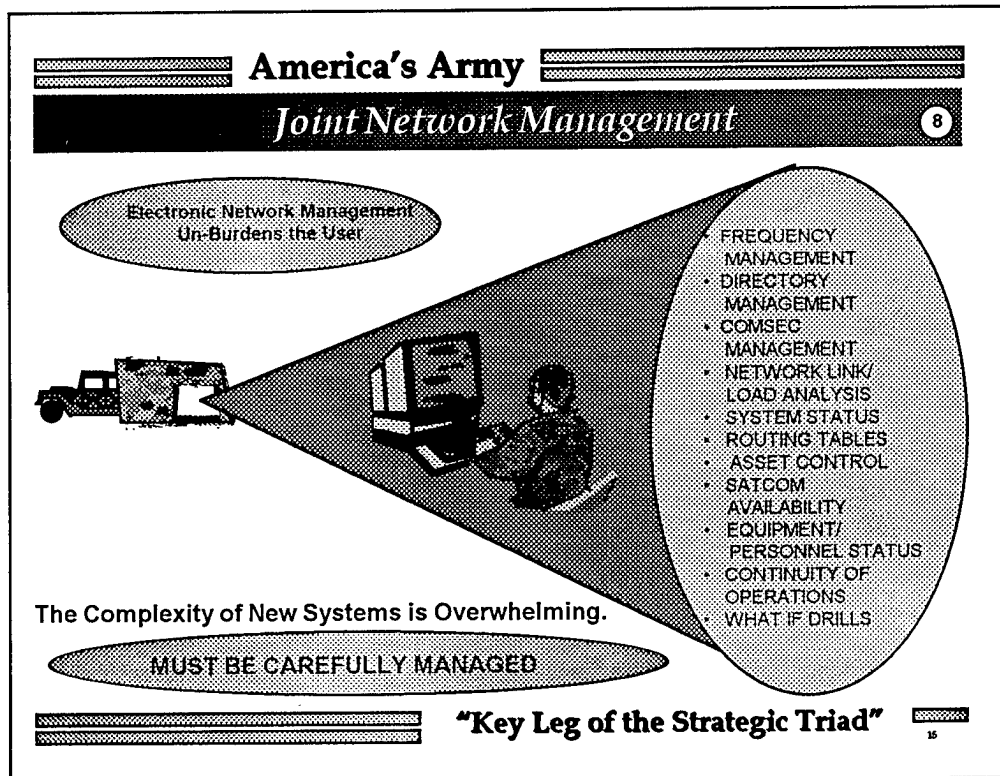
# Battle Command Battle Lab - Ft. Gordon



# Battle Command Battle Lab - Ft. Gordon



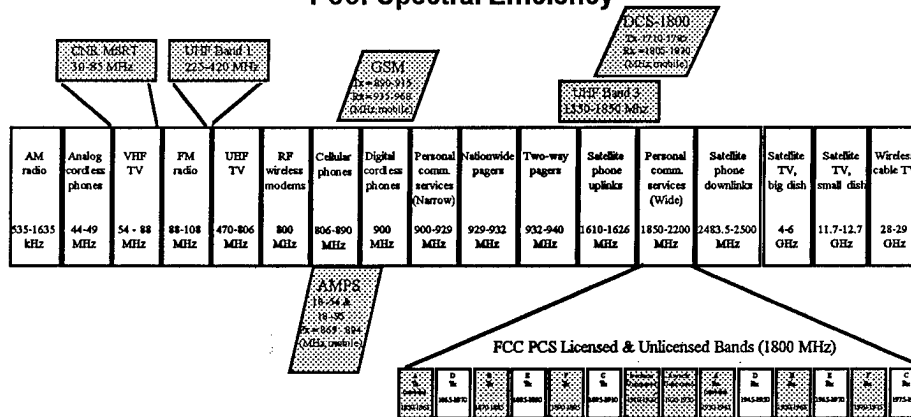
# Battle Command Battle Lab - Ft. Gordon



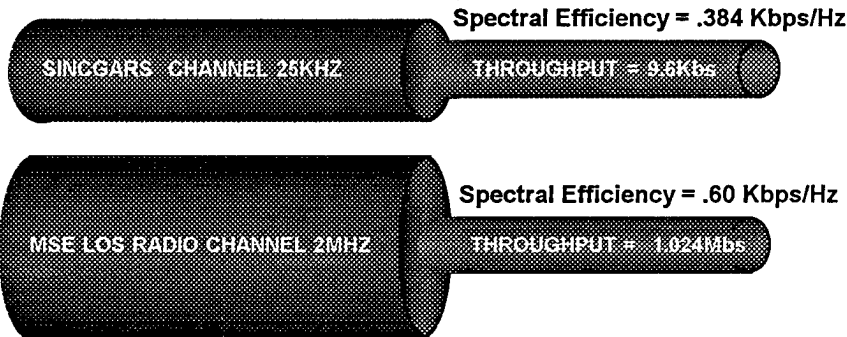
# Battle Command Battle Lab - Ft. Gordon

## SPECTRAL EFFICIENCY & COMPRESSION TECHNOLOGY

Spectrum Issues:  
Heavy Allocation of Frequency  
Military Losing Dedicated Spectrum  
Poor Spectral Efficiency



## SPECTRAL EFFICIENCY / COMPRESSION TECHNOLOGY



**BOTTOM LINE:**  
Need New Waveforms &  
Compression Technology  
To Provide Better Spectral Efficiency  
( More Bits / Hz )



## *Depth & Simultaneous Attack Battle Lab*



### **Depth and Simultaneous Attack Battle Lab Technology Interests**

**Mr. George Durham**

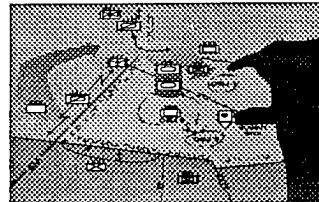
**Assistant Deputy Director**

**Depth and Simultaneous Attack Battle Lab**

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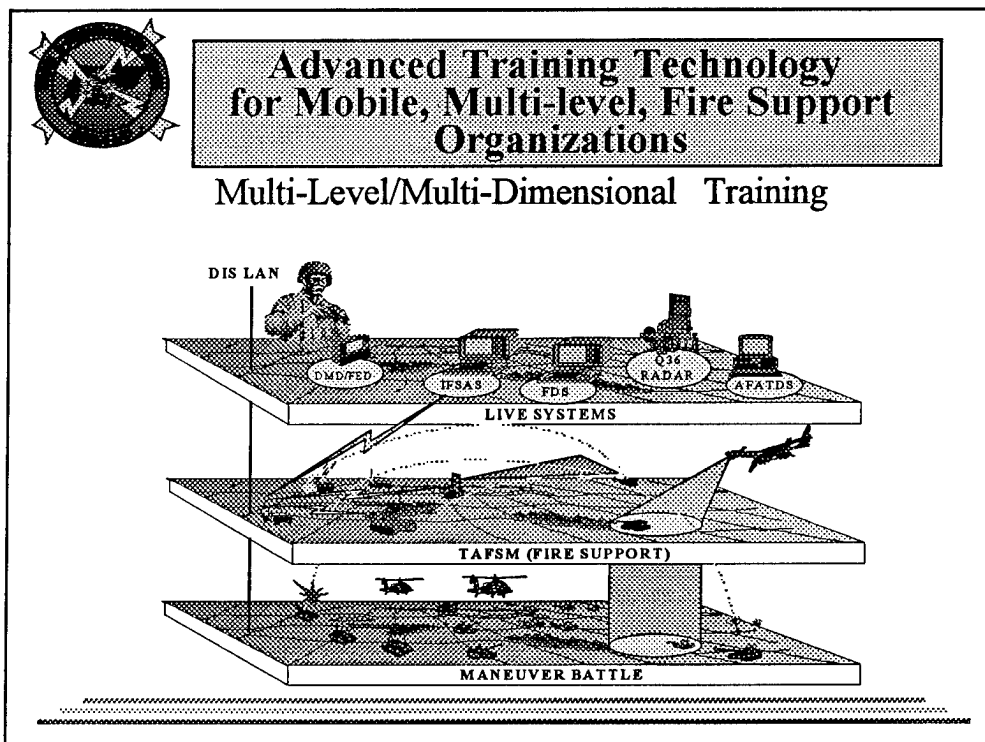


### **Advanced Training Technology for Mobile, Multi-level, Fire Support Organizations**



**To demonstrate prototype interactive, collaborative,  
modular training technology which progresses beyond  
stand alone, localized training in a static operational  
or training environment to emphasize enhanced  
mobility corresponding to the supported force and  
the theater of operations.**

## *Depth & Simultaneous Attack Battle Lab*



### Advanced Training Technology for Mobile, Multi-level, Fire Support Organizations

#### MAJOR CHARACTERISTICS

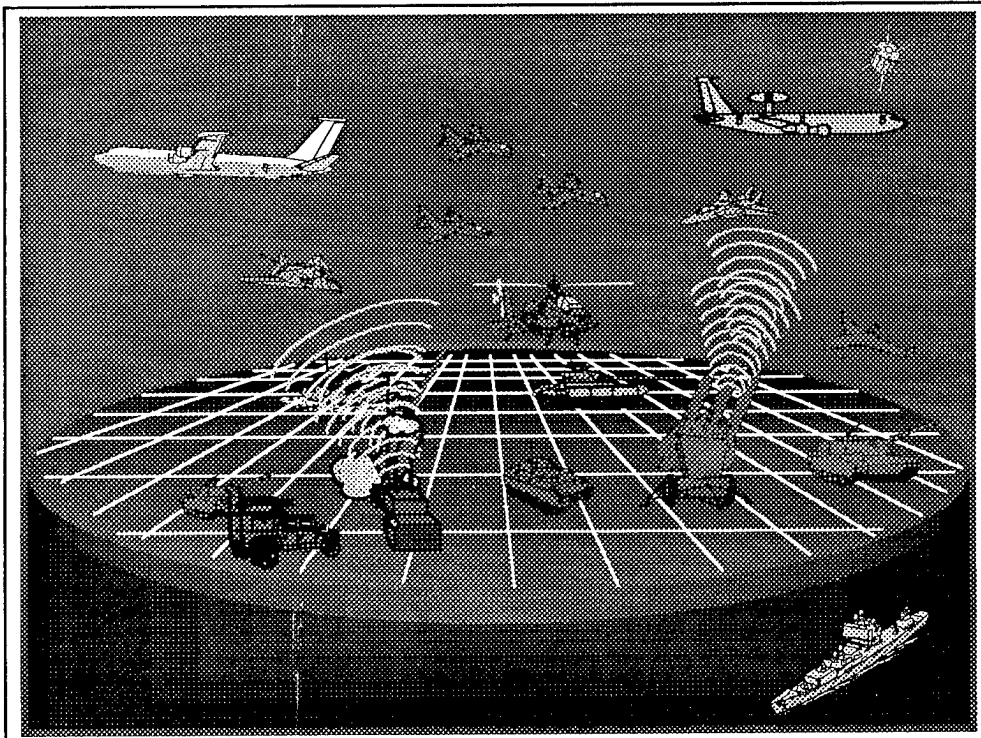
- Train and evaluate over actual tactical systems (hardware-in-the-loop)
- Modify scenarios quickly and easily to meet the needs of a dynamic, interactive environment
- Deploy small, mobile, wireless, lightweight, low power consumption training technology for both light and heavy forces
- Enhance mobility corresponding to supported force and theater of operations
- Execute on the move, while maintaining required scenario control and facilitate dynamic intervention, data collection of student/operator input, after-action assessment capability and student/operator record keeping

## *Depth & Simultaneous Attack Battle Lab*



### **Directed Energy Weapons for Air Defense**

**To demonstrate Directed Energy Weapons (DEW) as a  
replacement/complement to missiles and bullets, low  
cost per kill and compact weapons.**



## *Depth & Simultaneous Attack Battle Lab*



### **Directed Energy Weapons for Air Defense**

#### **MAJOR CHARACTERISTICS**

**Include, but are not limited to, High Energy Lasers  
and High Power Microwaves which:**

- Decrease use of conventional munitions
  - Operate on the multidimensional, non-linear,  
distributed battlefield
  - All weather operations capability.
  
  - Inflict lethal damage or disabling disruption to critical  
components.
  - Destroy or disable air, space or surface threats to the  
force.
-

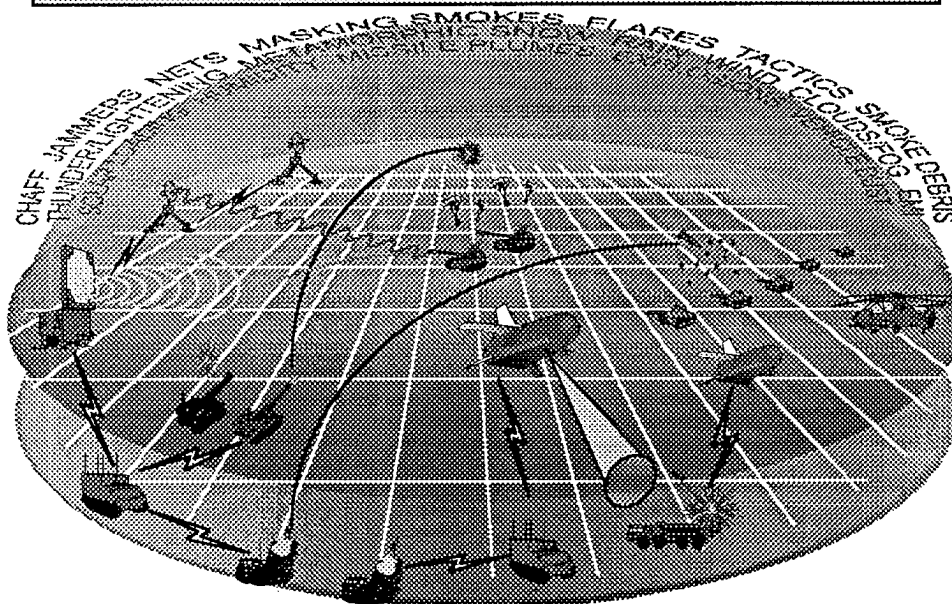
## *Depth & Simultaneous Attack Battle Lab*



### **Advanced Sensor Capabilities for Synchronized Precision Attack**

**To demonstrate through simulations and/or field testing, the physical limitations of various sensor technologies, and incorporate this knowledge into a reconfigurable simulation.**

### **Advanced Sensor Capabilities for Synchronized Precision Attack**



## *Depth & Simultaneous Attack Battle Lab*



### **Advanced Sensor Capabilities for Synchronized Precision Attack**

- **Each sensor type (acoustic, millimeter wave, infrared, LADAR, magnetic, visible...) is affected differently by each component of “the fog of war”**
- **As sensor technologies proliferate and sensor requirements and costs increase, it is necessary to compare sensor capabilities under all conditions in simulations prior to live testing.**

***Combat Service Support Battle Lab***

**Combat Service Support (CSS) Intranet**

**COL Larry Matthews  
Deputy Director  
CSS Battle Lab**

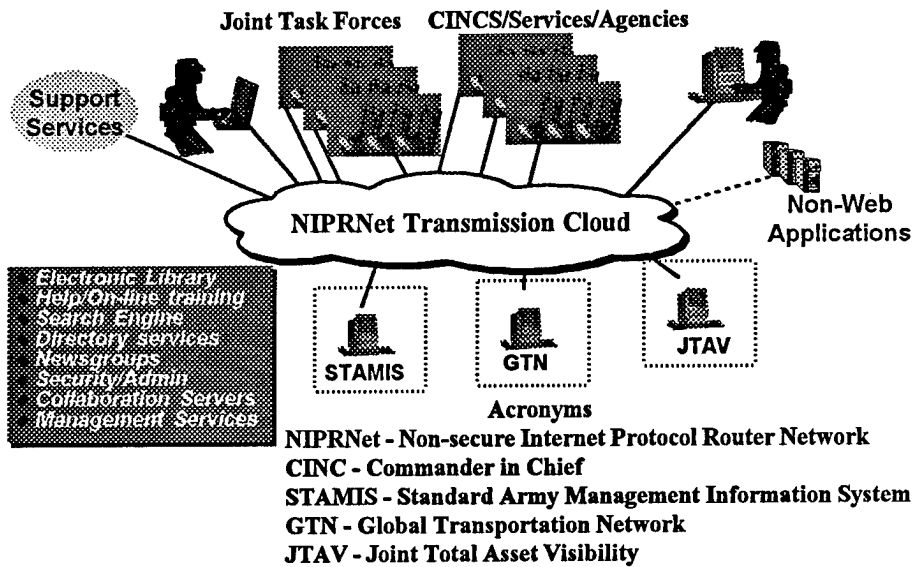
**UNCLASSIFIED**

**Combat Service Support (CSS) Intranet**

**The CSS Intranet will provide wireless web-based capabilities for the warfighters and CSS staff to locate, access, and integrate combat support information, applications, and support services from a single desktop computer.**

## *Combat Service Support Battle Lab*

### Combat Service Support (CSS) Intranet

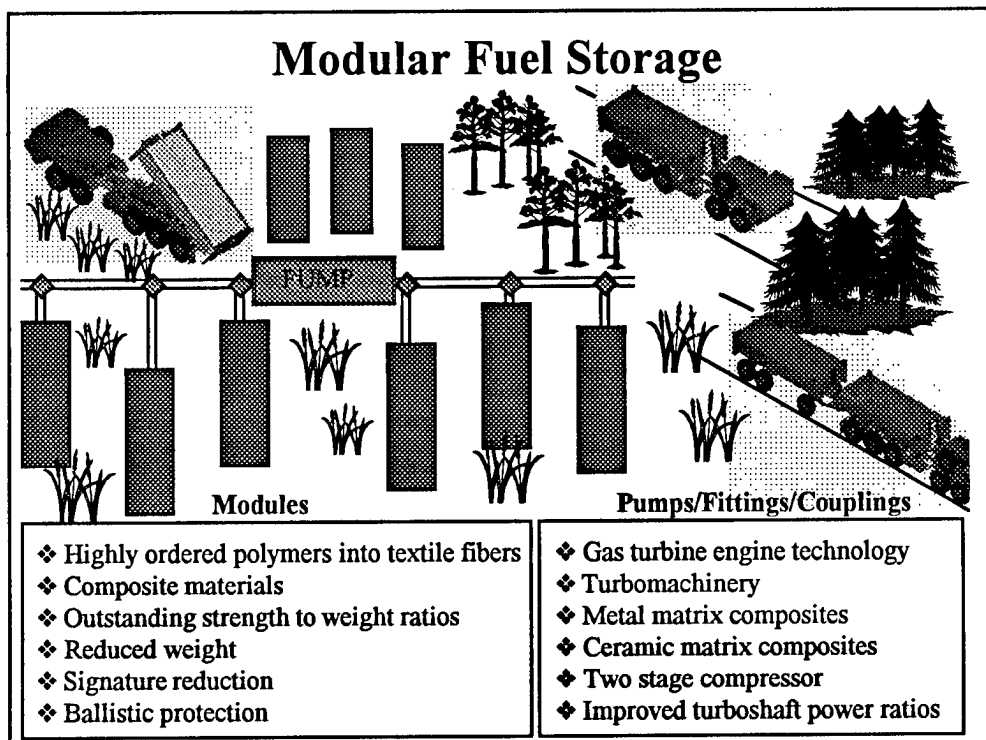




# Combat Service Support Battle Lab

## Modular Fuel Storage

Modular fuel storage is an initiative to improve fuel storage operations in the heavy divisions' area of operations. The focus is on efficiencies gained from rapid delivery of an entire bulk fuel load without transferring fuel from vehicle to collapsible bag. The concept provides for the storage of Class III (B) using fuel modules, which fit on a Load Handling System truck with trailer, replacing the 10,000 gallon collapsible storage bags in the divisional fuel system supply point (FSSP).



# Combat Service Support Battle Lab

## Logistics Survivability

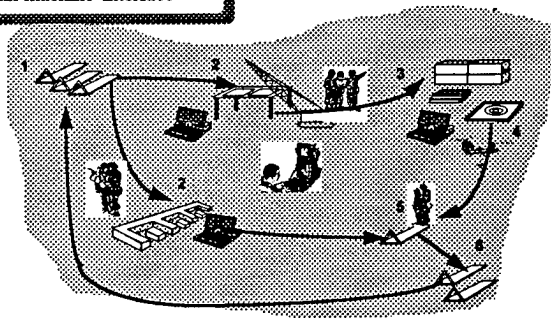
Provide survivable, flexible, responsive, and mobile munitions logistics supply systems for our power projection force:

- Survivable ammo supply area that protects critical munitions and reduces the logistics footprint.
- System of equipment enhancements to increase munitions distribution velocity.

## Logistics Survivability

### Unconventional Materiel Handling Equip

- Non-linear controls
- Smart materials
- Man-machine interface



### Sea-Based Sustainment

- Commercial ammunition ship off-shore resupply technologies
- Mission Configured Load preparation shipboard
- Helicopter delivery technologies

### Advanced Air Delivery

- ISO Container Handling Sys
- Ground Handling System
- Universal Transfer Platform

### Modular Packaging & Containerization

- Advanced packaging designs
- Modular containerization designs

### Intelligent Ammo Supply Area

- Automated warehousing
- Multiple MHE with one operator

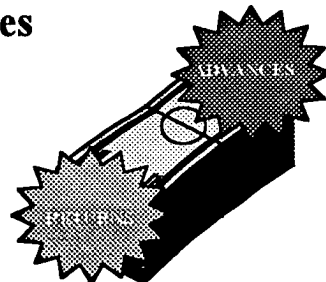
## ***Combat Service Support Battle Lab***

### **MARC Cash Advance / Collection**

Utilize the MARC (or other standard issue "Smart Card") to efficiently advance and collect cash on the battlefield. The system will utilize administrative data stored on the card to create transactions. The system will write the customer's cash advance / collection data on their MARC. The system must interface with current disbursing and accounting systems.

### **MARC Cash Advance / Collection**

- ◆ **Expands Turn-In Points on Non-Linear Battlefield**
- ◆ **Increases the Mobility of Paying Agents**
- ◆ **Prevents Departure of Agents from Theater with Outstanding Advances**

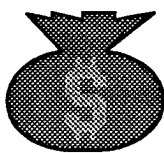


## **Combat Service Support Battle Lab**

### **Renewable Power Sources and Accessories**

**Renewable power sources that are, in comparison to conventional power sources, smaller, weigh less, provide increased levels of power, require minimal to no maintenance, and are not environmentally constrained in application.**

### **Renewable Power Sources and Accessories**



**Costs**

**We need renewable power sources that:**

- **Last Longer**
- **Have More Energy**
- **Are Environmentally Friendly**
- **Weigh Less**
- **Cost Less**



**Energy  
Requirements**



**Environmentally  
Friendly**



**Weight**

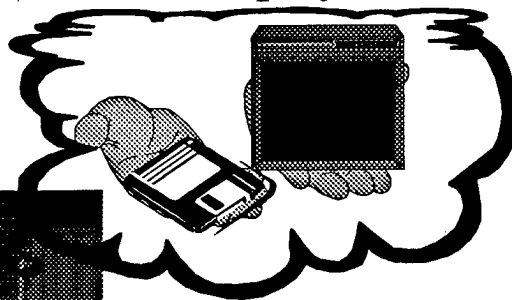
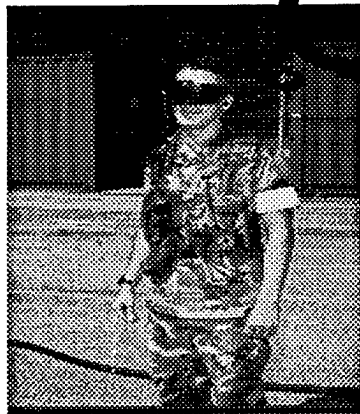
## ***Combat Service Support Battle Lab***

### **High Resolution, Low Power, Color Heads Up/See-thru Display**

This topic solicits the development of display technology which will lead to individual soldier low-cost, high-resolution heads-up see-thru displays. For medical purposes, these displays will be the interface between a multi-input hand-held non-invasive diagnostic sensor suite and medical decision-assist software. Such technology will allow hands-free data retrieval and prompting during far-forward combat trauma treatment.

### **High Resolution, Low Power, Color Heads Up/See-thru Display**

Hand-Held  
Diagnostics  
Sensor Suite



Display  
Technology  
to Reduce to  
Heads up  
See Thru  
Display

# ***Combat Service Support Battle Lab***

## **Combat Service Support Training Support**

- **“Micro-Worlds”—Problem Solving Tools for CSS Leaders**
- **Subset of Electronic Performance Support Aides**
- **Function of Desktop Modeling**



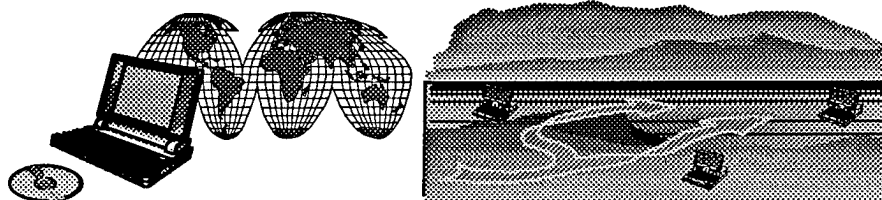
**Solve for:**

**When?  
Where?  
Which Route[s]?  
Which Step[s]?  
How Much?  
How Long?**

## **Combat Service Support Training Support**

**Deploy primarily as embedded tools in electronic documents on CD-ROM, notebook hard drives, and via the Internet:**

**Field Manuals; Technical Manuals; Training Manuals**



## ***Combat Service Support Battle Lab***

### **Combat Service Support Training Support**

**Use on student workstations, in Distance Learning classrooms, and with other equipment.**

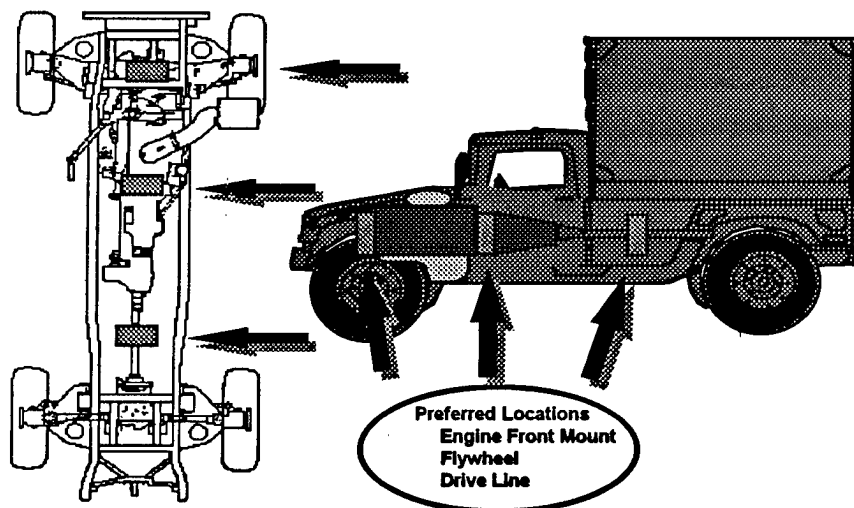


## ***Combat Service Support Battle Lab***

### **On-Board Integrated Vehicle Power Source**

**Looking for technology that will provide electrical power to operate the vehicle and ancillary or auxiliary equipment. The power source must be integrated as part of the vehicle and capable of generating alternating and direct current, simultaneously. This technology must provide sufficient alternating current to operate common tools, while supplying sufficient direct current to maintain vehicle operations and battery charging requirements. Power requirements should equal or exceed 75 DC amps and 5 kilowatts AC power.**

### **On-Board Integrated Vehicle Power Source**





# ***Early Entry Lethality and Survivability***

## **Remote Early Entry Force**

### **Sea State 3 (SS3) Vessel Discharge Enablers**

**COL Daniel R. Fake  
Deputy Director  
Early Entry Lethality, Survivability  
Battle Laboratory**

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TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

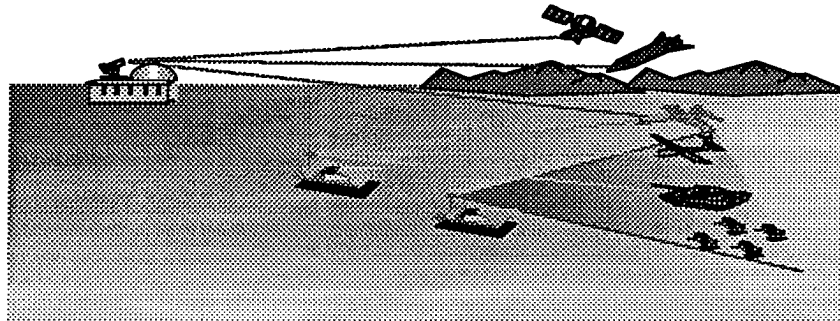
## **Remote Early Entry Force**

- Employ technologies that significantly increase individual and system survivability.
- Provide systems that encompass a combination of security reconnaissance, surveillance, target acquisition-designation, chem/bio detection and target attack capabilities (e.g., robotics, sensors, weapons).
- Enhance the commander's ability to shape the battlespace through remote and/or autonomous lethal and non-lethal capabilities prior to force arrival.
- Capability to assess risk prior to human force arrival.

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

## *Early Entry Lethality and Survivability*

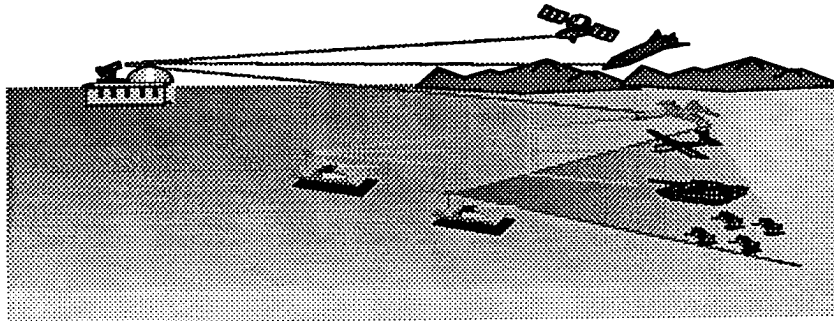
### **Remote Early Entry Force**



TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

## ***Early Entry Lethality and Survivability***

### **Remote Early Entry Force**



TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

### **Sea State 3 (SS3) Vessel Discharge Enablers**

- Provide technology that enhances the capability to discharge vessels anchored in-stream to lighterage and roll-on/roll-off discharge platforms during Joint Logistics Over the Shore (JLOTS) operations in sea state three (SS3) conditions.
- May include improvements to existing JLOTS systems or innovative technologies for direct mitigation of high sea states in the off-shore operating area.
- System/modification must be affordable, adaptable, user employable, transportable and survivable in SS3.
- Require an operable prototype system.

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

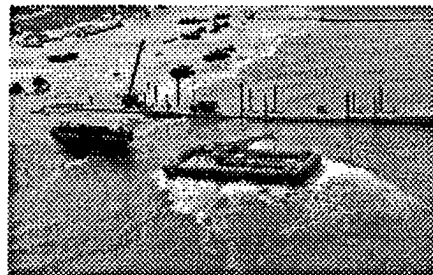
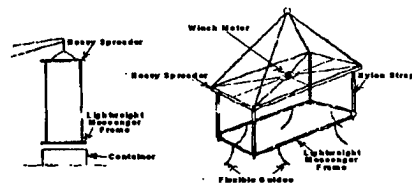
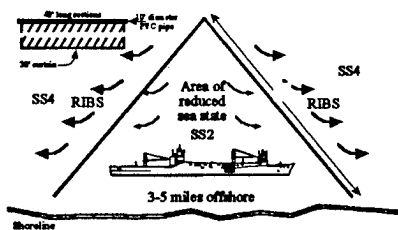
# Early Entry Lethality and Survivability

## Sea State 3 (SS3) Vessel Discharge Enablers

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TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

## Sea State 3 (SS3) Vessel Discharge Enablers



TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

# ***Dismounted Battlespace Battle Lab***

**Situational Awareness in Urban Terrain**

**Integrated Capabilities of Weapon Aiming  
and Acquisition**

**Mr. Richard Caravana**

**Dismounted Battlespace  
Battle Lab**

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TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

## **Situational Awareness in Urban Terrain**

- Employ technologies that significantly increase individual and small unit situational awareness while operating in urban terrain.
- Advanced concepts are sought that will provide a means to characterize urban structures, in three dimensions, to include soldier/unit sensors that determine the structure before it is entered and sensors that determine the structure as soldiers negotiate the structure.
- Included are 3D mapping, position location on the move and satellite masked navigation.

TRADOC: WHERE TOMORROW'S VICTORIES BEGIN

## ***Dismounted Battlespace Battle Lab***

### **Integrated Capabilities of Weapon Aiming and Acquisition**

- No capability exists for soldiers equipped with I2 devices to hand-off targets to soldiers equipped with thermal devices.
- A capability is required that will enable soldiers equipped with infrared image intensification (I2) devices to point out targets or other items of interest to soldiers equipped with thermal devices and vice versa.

## ***Air Maneuver Battle Lab***

**AIR MANEUVER BATTLE LAB  
U.S. ARMY AVIATION CENTER**

**COLONEL GARY COLEMAN  
DEPUTY DIRECTOR**



**UNCLASSIFIED**

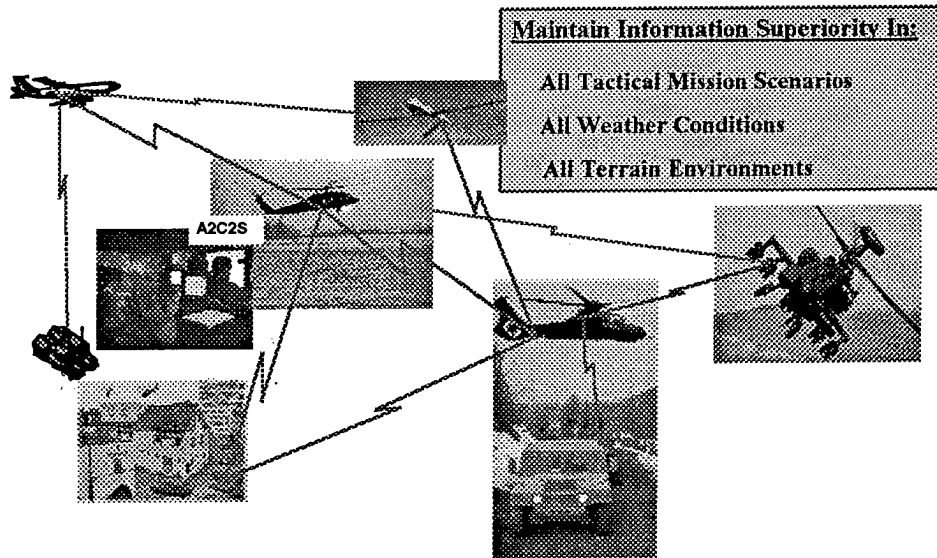
**Aviation Tactical Nap-of-the-Earth  
Non-Line-of-Sight Communications**



**Objective: To examine new concepts  
and new technologies that may enhance  
Army Aviation Tactical Nap-of-the-Earth  
Non-Line-of-Sight Communications capabilities**

## ***Air Maneuver Battle Lab***

### **Aviation Tactical Nap-of-the-Earth Non-Line-of-Sight Communications**





## ***Air Maneuver Battle Lab***

### **Manned and Unmanned Teaming Control**

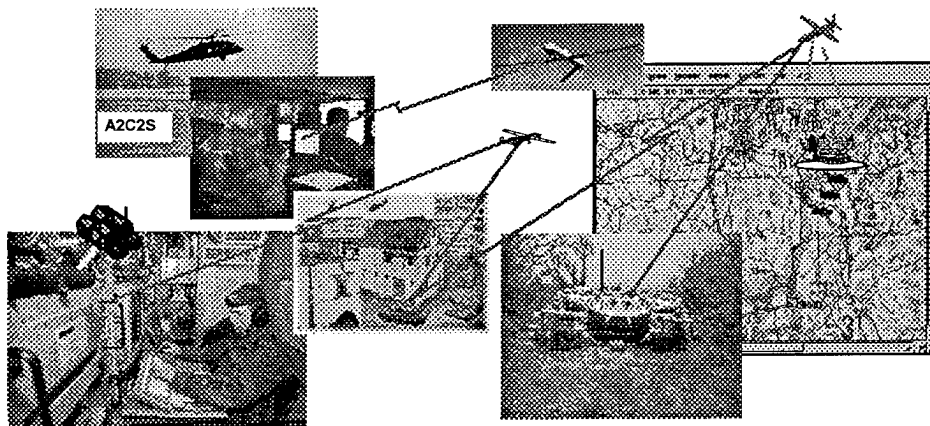


**Objective:** To demonstrate new concepts and technologies to enhance Army aviation cooperative team operation of manned and unmanned systems. The focus of this effort will be on man-in-the-loop control theories and mechanisms by which man-in-the-loop can control a variety of unmanned platforms.

### **Manned and Unmanned Teaming Control**



Demonstrate Man-in-the-loop control theories and mechanisms by which man-in-the-loop can control a variety of unmanned platforms



## ***Air Maneuver Battle Lab***

### **Airborne Non-Lethal Weapons**

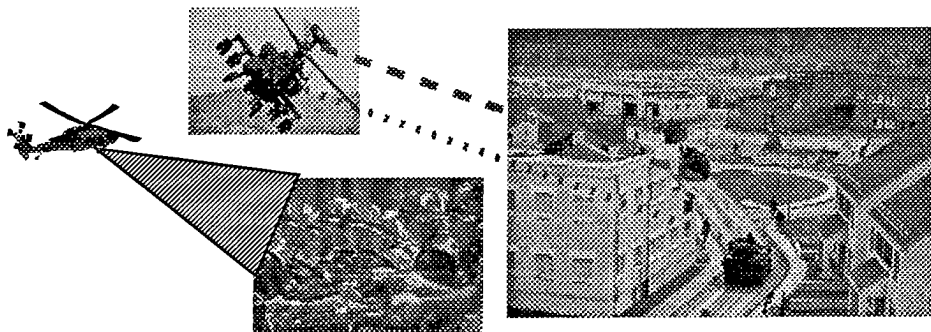


**Objective:** Evaluate aviation applications of innovative, less-than-lethal devices for military and commercial use. The goal is to increase mission effectiveness of helicopters in operations that require the application of non-lethal effects upon personnel and/or equipment.

### **Airborne Non-Lethal Weapons**



Evaluate aviation applications of innovative, less-than-lethal, devices for military and commercial use.



## ***Maneuver Support Battle Lab***

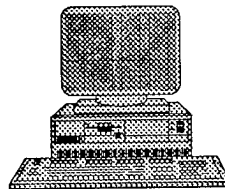
### **Auto Feature Extraction**

**Colonel Edwin J. Arnold, Jr.  
Deputy Director  
Maneuver Support Battle Lab**

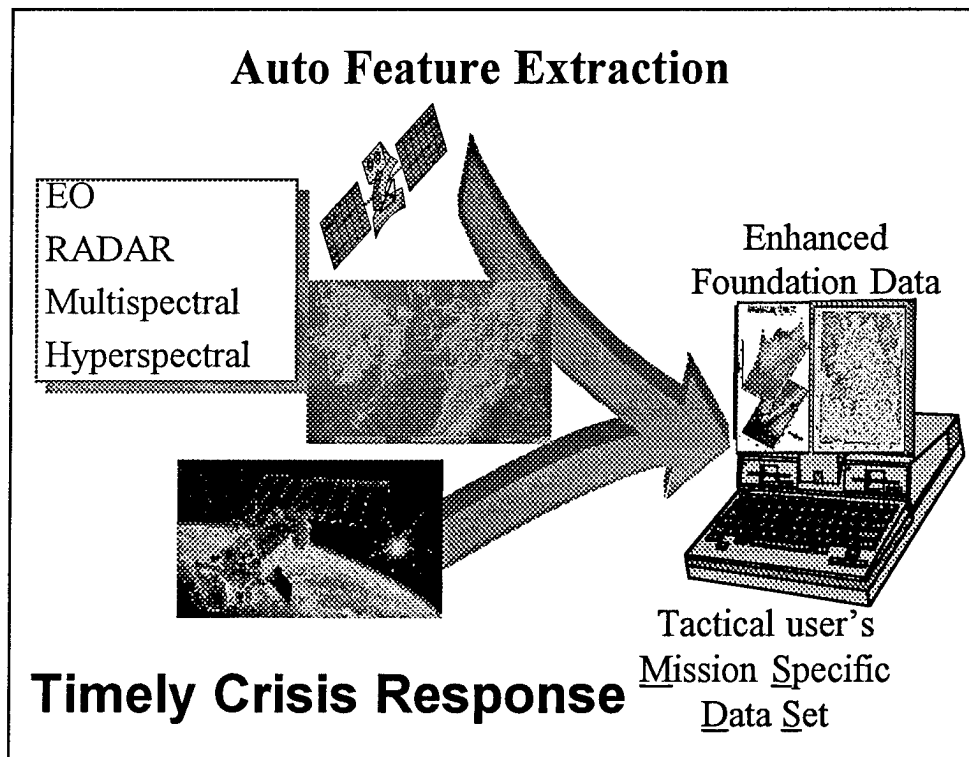


### **Auto Feature Extraction**

**Future terrain feature extraction and analysis tools to densify the existing Foundation Data using all available sources enabling the creation of a Mission Specific Data Set prior to deployment.**



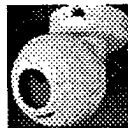
## ***Maneuver Support Battle Lab***



## ***Maneuver Support Battle Lab***

### **Advanced Tactical Security Systems & Barriers**

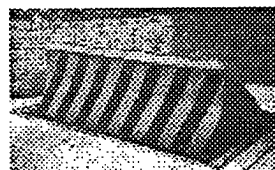
**Future automated security systems that provide security and protection for DOD personnel and property. Must provide detection and assessment capabilities as a minimum with an autonomous response capability in follow on systems.**



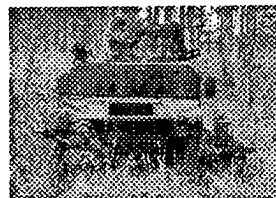
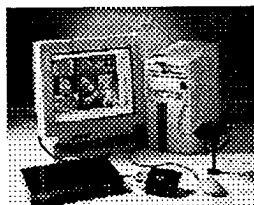
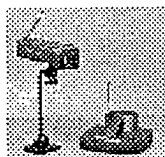
### **Advanced Tactical Security Systems & Barriers**



- Detect
- Assess
- React



Conserve manpower



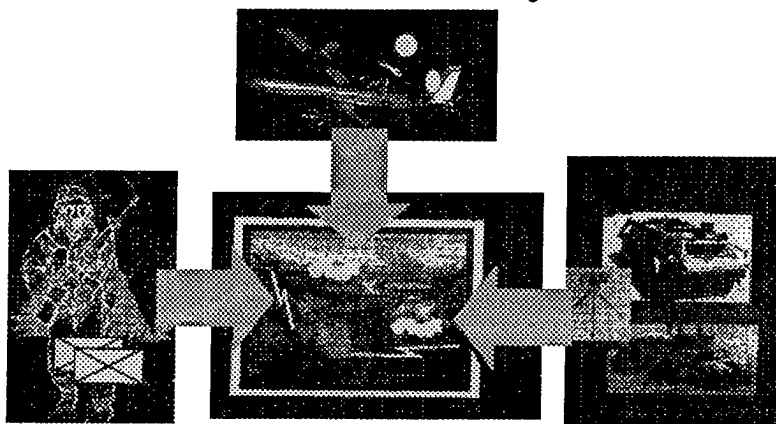
## ***Maneuver Support Battle Lab***

### **NBC Battle Command System**

**Future decision support system to analyze NBC information from battlespace visualization systems and track, model and simulate current and future NBC situations and provide recommended countermeasures.**



### **NBC Battle Command System**



- Joint NBC Warn/Report System
- Military Commo
- Local Weather Data
- Intelligence Data
- Medical & Civilian Systems
- Situational Awareness Data

Compatible with

NBC Battle Command System

## ***Maneuver Support Battle Lab***

### **Raptor Robotic Employment System**

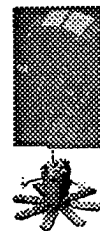
**Future remote/robotic advanced technologies  
capable of non-intrusive delivery to precise  
locations and recovery of the multiple (imaging  
/sensor and attack) components of the Raptor  
Intelligent Combat Outpost.**



### **Raptor Robotic Employment System**

Self-deployable up to 300 km

Precision employment to support  
reconnaissance/ surveillance  
target acquisition-designation  
target attack  
NBC Detection  
mine/countermine



Avoids obstacles, enemy contact/detection

Self protection/self destruction capability

Self recoverable upon mission completion

## ***Mounted Maneuver Battlespace Lab***



### **Brigade and Below Command and Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)**

Mr. David Estes  
Deputy Director  
Mounted Maneuver Battlespace Lab

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### **Brigade and Below C4ISR**

- Provide expanded, more efficient, and increased capabilities
  - Warfighter interaction and interface with C4ISR systems
    - Voice interaction
    - Multiple displays integrated into helmet
    - “Helmet conference” capabilities
  - Staff aids
    - Course of Action development and analysis
    - Information transformation to intelligence
    - Perception of battlefield

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### **Brigade and Below C4ISR**

- Provide expanded, more efficient, and increased capabilities
  - Heterogeneous distribution of information
  - Battlefield Operating System (BOS) and integrated displays of information
  - Virtual rehearsals
  - Embedded training
  - Distributed Interactive Simulation (DIS) compliant
  - Robust sensors (platform and unmanned) and sensor integration

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### **Brigade and Below C4ISR**

- Integration of systems with current and legacy systems
  - Army Tactical Command and Control Systems (ATCCS)/Army Battle Command Systems (ABCS)
  - Force XXI Battle Command Brigade and Below (FBCB2)
  - Common Hardware System 2 (CHS2)
  - Army communication systems

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### **RECONNAISSANCE**

- Expand the capabilities of mounted ground and air reconnaissance forces to detect and identify threat forces and activity
  - Includes the detection of NBC hazards and man-made obstacles
  - Perform all missions while stationary and on the move, during periods of limited/obscured vision, and beyond threat detection range
  - “over the hill” capability

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### **RECONNAISSANCE**

- Provide real time information to the mounted force commander
  - Heterogeneous distributive information flow
  - Rapid dissemination and integration gathered and passed over long distances
  - Synchronize fires
  - Significant improvement required in communications capability and data transfer to ensure integration with sensors and pass real time information to commanders

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### **RECONNAISSANCE**

- Sensors
  - All sensors integrated with other systems to ensure compatibility
  - Platform sensor packages capable of tailoring to mission and echelon
  - Ground, air and space based sensors to augment platform efforts
- Platforms and systems must be countermeasure resistant and have low signatures across all spectrums

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